X

REVIEW

OF THE

FOREST ADMINISTRATION

IN THE

SEVERAL PROVINCES UNDER THE GOVERNMENT OF INDIA,

FOR THE YEAR

1878-79.

BY

D. BRANDIS,

INSPECTOR-GENERAL OF FORESTS WITH THE GOVERNMENT OF INDIA.

Dated the 28th January 1880.

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A

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SUMMARY OF ADMINISTRATION.

Introduction.

THE most important event of the year was the appointment of a separate Conservator for the charge of the Dehra Dun and Jaunsar Forest Divisions in the North-Western Provinces, which forests it is intended to use for training Native apprentices for the post of Forest ranger, and Native probationers for the superior staff of the Forest Department.

Necessity of professional training recognized in 1866.

2. It took many years and required much writing and talking before the necessity of professional education of Forest officers was recognized in India. For a long time it was supposed that any one was suitable for Forest service, and that special knowledge was not only not needed, but might even be mischievous. The officers of the Forest Department were selected anyhow, without any regard to special qualifications. Under these circumstances progress was necessarily uncertain and unsatisfactory, and in many districts no progress at all was made, but the forests were being destroyed under the name of forest conservancy. The first step in the right direction was the permission granted by Government in 1866 to the writer of the present review to select two professionally trained officers in Europe, who had passed the examination for the superior Forest service in their own country, *viz.*, Mr. W. Schlich in Hesse Darmstadt and Mr. B. Ribbentrop in Hanover. Both these officers have done excellent service; one is Conservator of Forests in Bengal, and the other in the Pegu Circle of British Burma.

System of professional education organized in Europe.

3. The second step was the permission granted to him to organize a system of professional education in Europe for young Englishmen, to be selected annually by the Secretary of State on the ground of an examination held by the Civil Service Commissioners. This system was commenced in 1867, and the first officers educated under its provisions arrived in India in December 1869. With the exception of one year, this system has been regularly continued, and to the close of 1878-79, the number of trained officers thus obtained and posted to the Presidencies of Madras and Bombay, and the provinces under the Government of India, has been as follows:

Presidency of Madras	3	Officers.
„ Bombay	12	„
Government of India	37	„
Total	52	Officers.

From 1867 to 1873 a portion of the men selected were educated in the State forests of Hanover, and a portion were sent to the French Forest School at Nancy; but after 1873 all candidates were sent to Nancy, and a former Indian Forest Officer, Colonel G. F. Pearson, was placed in charge of the English students studying at that institution and still holds this position.

Of the 52 professionally trained officers who have thus joined the Indian Forest service, 6 have died or resigned their appointments, which leaves 46

officers still in the service, of whom 33 are in the provinces under the Government of India. The total sanctioned number of superior Forest officers from the class of Assistant Conservators upwards is 93, so that one-third of these officers have received a special training in their profession.

Professional training of subordinate staff.

4. It will be readily understood that it took a still longer time before the necessity of providing professional education for the subordinate officers was recognized. This end has, however, now been attained, and arrangements have been made at Dehra Dun to train natives, not only for subordinate appointments, but also for the superior branch of the service.

Organisation of department.

5. At the head of the Forest staff in each of the provinces under the Government of India is a Conservator, who has, subject to the control of the local Government, the direction of all Forest matters in his province. In provinces where the forests are of special importance or of great extent, such as British Burma and the North-Western Provinces and Oudh, the forests are divided into circles, each circle being under one Conservator.

The staff subordinate to the Conservator of the Circle or of the province, is divided into three great classes—

First.—Officers of the controlling staff, in charge of Forest divisions.

Second.—Officers of the executive staff, in charge of Forest ranges.

Third.—Officers of the protective staff, in charge of beats.

Qualifications required from protective officers.

6. For the officers of the protective staff the chief qualifications which are necessary to ensure efficiency are local knowledge, a strong constitution, active habits, honesty, and general intelligence. If with these indispensable qualifications are combined the ability to read and write in their own language, and to keep simple accounts, such additional qualifications will be regarded as an advantage; but at the outset there must be many Forest guards who are unable to read and write, and who may yet be very efficient protective officers. Eventually it may be practicable to insist upon a certain minimum standard of education among Forest guards, but any attempt in this direction at present would end in failure.

Qualifications required from executive officers.

7. A much higher standard of education must be required from the members of the executive staff, and this standard should be steadily raised, for the work of a well-organized Forest administration must mainly be performed by the officers in executive charge of Forest ranges. Executive officers may, however, with great advantage commence their career in the protective staff. Indeed, some of the best rangers, who are at present in the service, have commenced as foresters or Forest guards. And many Forest ranges, particularly those in which the work chiefly consists of protection, are and must remain in charge of foresters, because the revenue has not yet developed sufficiently to justify the employment of more highly paid officers. As may be expected in a business, the growth of which in this country is comparatively recent, a sharp division between the protective and executive staff is not yet in all cases possible.

Apprentices.

8. But the training obtained by service in the protective staff must at best be a slow and tedious course of preparation, and one that is not likely to suit the habits and tastes of the better educated classes. The Central Forest School has, therefore, been established, chiefly to make it easier for the sons of Native gentlemen, and of youths of other classes who have received a good school education, to acquire within a comparatively short time that amount of practical skill and theoretical knowledge which constitutes the professional training necessary for the executive staff. At the outset a minimum of educational acquirements is demanded from candidates, comprising only the ability to read and write, the elements of arithmetic, and a good knowledge of accounts. But this is only the minimum of requirements laid down, and these requirements must gradually be raised with the view of demanding eventually a good school education as an indispensable condition for the admission of apprentices to the Forest School.

At the same time it has been laid down that, as a rule, no apprentices will be received at the Forest School who have not proved their fitness for Forest work by service in the subordinate staff of the department during a period of not less than six months. During this period candidates for apprenticeships will

probably be employed mainly on protective duties, but local circumstances must indicate the arrangements which should be made in each province.

Apprentices who have received the Forest ranger's certificate at the school may not in all cases, on return to their provinces, find appointments vacant for them as Forest rangers. It may be necessary to employ them as Foresters or upon special works. But in whatever position they may be placed, they will be able to apply practically the skill and knowledge which they have acquired at the Forest School, and they will not only be more useful servants to Government, but they will, by their professional training, be better enabled to utilize every opportunity that may offer in their work for improving themselves.

Organization of controlling, executive and protective charges.

9. It will be evident that a good organization of controlling, executive and protective charges is essential, in order to make service as a Forest ranger useful as a preparation for superior service. No definite principles can at present be laid down regarding the maximum area of beats, ranges and divisions. These must vary in different districts and provinces according to circumstances, and must chiefly be regulated by the strength of the Forest establishments which the revenue realized may permit the Local Government to entertain. But so much may be said, that under a good organization a Forest guard's beat should not be larger than can be efficiently protected by one man: that a Forest ranger ought, as a rule, to be able, without inconvenience and without special arrangements, to visit the most distant beat of his range in a day's ride from his head-quarters; and that a division should not be larger than can be efficiently controlled by the divisional officer, who ought to be able, without great preparations and without his visit being made known beforehand, to visit each range under his control. An organization which fulfils these conditions will make it possible to entrust rangers with complete executive charge of their ranges, and if this is done it will eventually not be difficult to select the most efficient and trustworthy rangers and to promote them to the superior or controlling branch of the service. But obviously the first condition of success in this respect is to establish the beats, ranges, and divisions of a manageable size, so that the officers of all classes can really do justice to their charge, and so as to enable rangers effectually to supervise the protective officers under their orders, and divisional officers to exercise a thorough control over Forest rangers. A staff of trustworthy and efficient Forest rangers is the first condition of effective local Forest Administration, and the chief object of the Forest School at present is the training of such a class of officers.

Probationers.

10. But it has been thought that we might at once advance a step further and arrange the training for the controlling staff of Forest rangers or of young men of good social standing, sons of Native gentlemen with a superior education and possessing special qualifications for the Forest service. With this view it has been proposed to form a second and higher class of students, to be styled Probationers. Higher educational qualifications will be required from such candidates than from apprentices, but in order to ensure their being familiar with the executive work of the department, it has been laid down that, as a rule, no probationer should be promoted to the rank of Sub-Assistant Conservator, who has not served at least two years as a Forest ranger. Probationers, therefore, who enter the School without previous experience as Forest rangers, must, in the first instance, be trained for the duties of that class in the School forests, and they will, if successful, earn the Forest ranger's certificate. Those among them who distinguish themselves by special aptitude for the superior staff, and who are otherwise fully qualified, may, in addition to the Forest ranger's certificate, obtain the higher certificate of being eligible for promotion to the class of Sub-Assistant Conservator. But though they may have earned the higher certificate at the School, they will not be promoted to the class of Sub-Assistant Conservator, unless they have actually served two years as Forest rangers in their own province, or in another province, as the case may be. In the course of their service, Forest rangers will learn by actual experience that honesty is enforced and rewarded, and that without honesty and probity efficiency is impossible. This plan must, however, be aided by professional education. It may be urged that probity and professional skill are two things apart, which have no necessary connection. But professional education will have this great advantage, that it will increase a feeling of self-respect. Further experience will doubtless show that Forest rangers who have received a thorough

professional training will not only be more efficient by reason of the superior skill and knowledge which they have acquired, but that among them will also be a larger proportion of officers who can be trusted to discharge the duties of the higher and more responsible appointments with integrity and single-minded devotion to their work.

The number of probationers will necessarily be small

11. The number of appointments in the superior staff which will be available for men of this class will, however, be small, because for a considerable time to come it will be necessary that the controlling staff should continue to be recruited mainly by the appointment of officers who have received their professional education in Europe under the arrangements detailed above. On arrival in India junior officers, who have thus been professionally educated in Europe, commence their service in the executive staff, being placed in charge of Forest ranges, and they are not placed in charge of Forest divisions, until they have acquired the necessary experience in executive work. At present therefore and for some time to come the training of Forest rangers will be the chief task to be accomplished at the Forest School.

Training of the Forest School to be chiefly practical.

12. The education proposed to be given to apprentices and probationers at the Forest School will be chiefly of a practical nature, and these students will be employed according to circumstances either on special works or in charge of small Forest ranges after they have acquired the needful experience.

The work that must be done in the School forests in the way of fire protection, planting, thinning, charcoal-making, the construction of roads and bridges and timber operations, is extremely varied, and will afford instructive employment for a number of probationers and apprentices. Besides this, there are the operations of the Forest survey, including valuations made of forests in the North-West and the adjoining provinces; the work at the forest gardens proposed to be established in the School Circle; and meteorological and other observations, as well as experiments to test the physical properties of different kinds of timber.

Course of theoretical instruction

13. There will, however, also be a course of theoretical instruction in mathematics, sylviculture and forestry generally, as well as in the elements of law and those branches of the natural sciences which are most useful to Forest officers in India. This course of instruction it is proposed to hold at Dehra Dun during those summer months, when out-door work in the forests is uniformly slack.

Language in which instruction will be imparted.

14. Eventually it is probable that all instruction will be imparted in English, but at the outset a knowledge of English will only be required from probationers and from those apprentices who are not familiar with Hindustani.

The number of students should be limited at the outset.

15. The main condition of success of this institution will be the good management of the forests attached to it. Hence it is essential that at the outset only a limited number of apprentices and probationers should be sent for instruction. As the system of management developes and becomes more perfect, the number of students should gradually be increased. The organization has purposely been so framed that the forests attached to the School may be self-supporting, and it is essential that this point should be kept in view, for it is the best safeguard against a reaction against the maintenance of the School.

Students to be selected by Conservators and to be employed in the province from which they are sent.

16. The necessity of a professional training for Forest rangers is by no means generally recognized, and many Conservators will prefer to continue the existing system, under which Forest rangers are selected from among the most promising Forest guards or Foresters, or picked up elsewhere. Nor is it intended in any way to compel Conservators to send candidates to the Forest School; on the contrary, they are left entirely at liberty in this matter, and it has also been provided that no candidate shall be received at the School either as a probationer or as an apprentice who has not been selected and sent by a Conservator; on the other hand, the Conservator undertakes the responsibility of providing employment in his province or circle for all probationers or apprentices sent by him to the School, who have received the Forest ranger's certificate.

Number of students likely to be sent

17. The total number of Forest rangers sanctioned in the provinces under the Government of India is 122, and assuming 5 per cent. to be the rate of permanent vacancies, about six recruits would be required annually. This then must, under existing circumstances, be regarded as the maximum limit of students who can annually be sent to the Forest School by Conservators, and at the outset it is not likely that more than three or four candidates will be sent in

a year. But as the Forest revenue increases, the number of Forest rangers will also increase, and eventually, if the institution is well managed so as to secure the confidence of Conservators, it will be used for the training of a very large number of students.

Under these circumstances it will be evident that the development of this institution must necessarily be slow and gradual, and that if it is not self-supporting, there may be considerable risk of its being abolished.

Collections of timber and forest produce sent to public institutions in India, Europe and America.

18. In the review for 1877-78 the despatch of a large collection of timber and other forest produce to the Paris Exhibition was adverted to. At the close of the Exhibition this collection was presented to the Nancy Forest School, where it has been admirably arranged, and will serve to give the English Forest students destined for India some preliminary knowledge of the timber and other produce of the forests for the administration of which they are being educated.

A second collection, consisting of 1,113 specimens and nearly as rich as that sent to Paris, was sent to the Royal Gardens, Kew, and the following collections were sent to other institutions in India, Europe, and America:—

Conservators of Forests in India	8,085
Forest School at Dehra Dun	517
Office of Inspector General of Forests, Calcutta . .	844
Economic Museum, Calcutta	100
Dockyard, Calcutta	66
Messrs. Mackinnon, Mackenzie & Co.	70
India Museum, London	1,158
Civil Engineering College, Cooper's Hill, London . .	134
Royal Botanic Gardens, Edinburgh	147
The Königliche Landwirths Chaftliche, Berlin . .	719
The Polytechnicum at Stuttgart	637
The Prince of Fürstenburgh	120
Royal Saxon Forest School, Tharant	120
Dr. Nördlinger, Hohenheim	138
Vienna	500
Royal Italian Forest School, Vallombrosa . . .	166
Department of Agriculture, Washington	219
Minister of the Interior, Japan	120
For use in preparing a Manual of Indian Timbers. To be eventually sent to the Forest School at Dehra Dun . .	1,500
Total .	15,360

Specimens of woods sent for sale to London

19. After making up these collections, a considerable quantity of pieces remained, which were sent as an experiment for sale to Messrs. Churchill and Sim, London. The best pieces having been selected for the Exhibition and other collections, the material sent for sale was not of the best description, but the desired result was attained, *viz.*, to draw attention to some of the more valuable woods of India not hitherto known in the London market. The amount realized by the sale of these pieces was £71.

The prices obtained cannot be taken as a fair indication of the intrinsic value of the woods, for some kinds drew a fair competition, others were neglected, and a few realized more than the market value. Upon the whole, it may be said that the best prices were paid for woods already known to the trade, such as walnut, rosewood and padouk, and that, of the others, the harder and darker-coloured woods were most appreciated. But the amounts realized by the sale of these woods was of no great importance; what was desired was to afford an opportunity for testing practically the value of the woods for carriage building, for furniture, and for turning and other work. The experiment was only a beginning, and was necessarily made under unfavourable circumstances. But it has been suggested to the Conservator of Forests to continue the experiment and to send Messrs. Churchill and Sim from time to time selected consignments of correctly named woods likely to find favour with the trade, with complete lists, and all necessary information regarding them.

District arboriculture in the Punjab.

20. It is here the place to allude to the connection between district arboriculture and Forest Administration in the Punjáb. In this province the Conservator was, a few years ago, requested by the Local Government to receive and review the reports of all agricultural operations under district and canal officers. In the dry climate of the Punjab the planting of trees along canals

and along the roadside, and the promotion of tree-planting generally, is a matter of the greatest importance, and the comprehensive review of these operations by the Conservator has been found very useful. In passing orders on the Agricultural Reports by district and canal officers for 1878-79, and on Mr. Baden Powell's review of the same, the views of the Punjab Government on this subject, are expressed as follows :—

"The Lieutenant-Governor considers that the subject of district arboriculture is one of the greatest importance to the prosperity of the country and the convenience of the public, and if the matter is carefully managed, it will almost everywhere return a considerable profit on the outlay made. The suggestions and remarks of the Conservator are of the greatest value for the guidance of district officers, and the Lieutenant-Governor desires that the Commissioners of Divisions will see that his recommendations are carefully observed in all districts.

"The Conservator of Forests took up this subject a few years ago at the special request of Government, and has devoted much attention to it, which, the Lieutenant-Governor trusts, will produce good results, if the attention of the district authorities is properly given to the matter."

In other provinces.

21. In the North-Western Provinces district arboriculture is under the general control of the Director of Agriculture. In most provinces the Forest officers give help in this respect by furnishing seeds and plants. Thus, during the time that a special Forest officer was in charge of the reserve in Ajmere and Merwara, the road avenues and district nurseries were under him, and the result was most beneficial.

Establishment of Forest gardens.

22. In order to promote arboriculture and to place the experimental cultivation of exotic trees upon a more satisfactory footing, the Government of India suggested, in a circular, No. 63F, dated the 5th November 1878, the formation of Forest gardens for the cultivation of indigenous and exotic trees and the distribution of plants for road-side avenues and other purposes. Much attention has at different times been devoted to experiments with exotic trees, while the result has in no wise been commensurate with the time and money expended upon these experiments. Seeds and plants have been distributed wholesale and on a large scale, to be grown by village officers or subordinate civil officers all over the country; and this has often been done in the case of trees foreign to the district, regarding which it was not certain whether they would grow and could usefully be cultivated in the district. Such experiments can only lead to a reliable and practically useful result,—if they are in the first instance made in a few selected localities under the supervision of competent officers resident on the spot, and for this purpose the establishment of Forest gardens in suitable and carefully selected localities has been recommended by the Government of India for the consideration of local authorities.

CHAPTER I:

RESERVED AND LEASED FORESTS.

Area and boundaries.

Summary.

23. The following was the area of the demarcated reserves at the commencement and close of the year, as entered in the provincial reports :—

Provinces	Area of Reserved Forests on 1st April 1878.	Area of Reserved Forests on 31st March 1879	Remarks
Bengal	3,430	2,967	
North-Western Provinces and Oudh	3,473	3,260	
Punjab	3,791	791	
Central Provinces	2,548	2,501	
British Burma	650	1,410	
Coorg	295	295	
Ajmere	100	100	
Assam	1,982	1,983	
Total	16,269	13,307	
Mysore	442	454	
Berar	1,402	1,366	
Grand Total	18,113	15,127	

24. As explained in the Review for 1877-78, the term "Reserved Forests" comprises forests so declared under the Indian Forest Act, as well as those which have been constituted Reserved forests, State forests, or Government forests under other rules. With the exception of some districts, the Indian Forest Act is in force in Bengal, the North-Western Provinces and Oudh, the Punjáb, the Central Provinces, and Assam, and in these provinces the reserved forests entered in the above statement are those which have been thus declared under the Indian Forest Act. It will be noticed that in these provinces the area of the reserved forests was less at the close than at the commencement of the year, and the reason of this is, that it was not found expedient to declare the whole of the forests reserved forests under the Act, which had been thus declared under the former rules. **Forests declared Reserved Forests under the Indian Forest Act.**

25. Thus in Bengal 3,430 square miles had been demarcated at the close of 1877-78 as reserved forests under the old Bengal Forest Rules; and of this area 2,967 square miles were in 1878-79 declared reserved forests under the Indian Forest Act. The difference comprises certain areas in the Singhbhoom and Hazaribagh districts which it is proposed hereafter to declare reserved forests under the Act, and the Damin-i-koh in the Sonthal Pergunnahs, which will probably be excluded altogether from reserved forests. **Bengal.**

26. In the North-Western Provinces and Oudh, the figures entered in the Review for 1877-78 were:— **North-Western Provinces and Oudh.**

	Square miles.
North-Western Provinces	2,360
Oudh	1,113
Total .	3,473

The statement entered in the present Review contains one entry only for these provinces, and it will be noticed, that the area of reserved forests was reduced during the year from 3,473 to 3,260 square miles. A portion of this reduction, however, is due to corrections in the area, regarding which it is stated that even now they can only be considered to be approximately correct.

27. In the Punjab the decrease of the area previously declared reserved forest is greater than in any other province; only 791 square miles out of 3,791 having been declared reserved forests in due legal form. Of this area 298 square miles have been declared reserved forests under the Indian Forest Act, *viz.*, 104 in the Rawalpindi district, 43 in Gujrat, 60 in the hills of Gurdaspur, Hushiarpur, Amritsur, and Kangra, 51 in Multan, and 40 square miles, comprising the plantations, in the plains. **Punjab.**

236 square miles in the Hazara district were also declared reserved forests under the Hazara Forest Regulation, 219 under the rules forming part of the lease of the Chamba forests, and 38 under the Bashahr forest lease.

A great deal remains to be done in the Punjab before measures can be taken to demarcate legally, and to settle the large area previously included under reserved forests. As the Conservator says in paragraph 6 of his report, the difficulty consists in this, that there is nowhere in the Punjab, except in the "Bar" and in a few other remote places, any large excess of forest, and consequently all measures of forest conservancy must necessarily interfere with the present interests of the people. For this reason the task of providing permanently for the forest requirements of the country is singularly difficult in the Punjab.

28. In the Central Provinces there were under the old Forest rules two great classes of forests, called Reserved Forests and Unreserved Forests. As regards the rights of Government there was no difference between these two classes, the lands included in both classes being the absolute property of Government, without any rights in them of other persons. The difference between these two classes only related to the intentions of Government. In regard to those which were formerly called Reserved Forests, the intention was to maintain them permanently as forest, and efficiently to protect, improve and gradually to extend them. On the other hand, it was intended that those Government forests which were not thus reserved to be permanently maintained as forest, and were therefore called Unreserved Forests, should be **Central Provinces.**

available for the extension of cultivation; and that meanwhile they should be utilized to supply wood, pasture, and forest produce to the people in their vicinity.

However, as there was no difference between these two classes of forests, as regards the essential question of rights, it was decided to declare both as reserved forests, but to maintain a distinction in so far that those lands which it is intended permanently to maintain as forest, are designated as reserves of the first class; while those which may, though not immediately, be made available for the extension of cultivation, are designated as second class reserves. The area of these two classes is as follows:—

	Square miles.
First class reserves	2,501
Second class reserves	16,882
Total .	19,383

In the above statement only the reserves of the first class are included, and the results of the management of the second class reserves will be stated in the second chapter of this review.

Assam.

29. In Assam the whole of the forests notified as reserved forests under the old Rules, have been declared under the Act.

Coorg, Ajmere and Burma.

30. In the other provinces the Rules under which forests had been declared to be reserved remained the same. In Coorg and Ajmere no change in the area took place; in Burma considerable progress was made in demarcation, and the area was increased during the year from 650 to 1,410 square miles. But the area declared reserved forest in Burma includes a number of large enclosures of land assigned to Karens for their toungya cultivation, which cannot properly be reckoned as forest. This area aggregates 170 square miles, so that the total area of reserved forests in the province was actually only 1,240 square miles. In one district, *viz.*, Tharawaddy, demarcation is reported to have been nearly completed.

Mysore and the Hyderabad Assigned Districts.

31. In Mysore there have been several corrections in area: a small area has been transferred to Madras in consequence of the settlement of a boundary dispute; and there has been a small addition of 7,680 acres to the Madagiri forest in the Tumkur district. The result of these alterations is the increase of the area of reserved forests from 442 to 454 square miles.

In the Hyderabad Assigned Districts, an area of 120 square miles was excluded from the Melghat Reserves; but in other districts additions were made, which bring up the total area of reserved forests at the close of the year to 1,366 square miles. As explained in the Review for 1877-78, there are two classes of reserved forests in Berar, and the area of these two classes is as follows:—

	Square miles.
State forests in charge of forest officers	866
Reserved district forests in charge of Civil officers . .	500
Total .	1,366

There is, however, some doubt regarding the exact area of the reserved district forests in Berar.

Outlay on demarcation

32. The outlay charged in the accounts of the year for demarcation was Rs. 40,144; Rs. 11,730 being the share of this outlay in Burma, in which province the chief additions to the area were made. In the Punjab the outlay was Rs. 7,100; in Bengal Rs. 6,918, and in the North-Western Provinces and Oudh Rs. 6,096. As explained in last year's review, this outlay is incurred not only for the demarcation of additional areas, but also for the maintenance and improvement of the boundaries of existing reserves.

Compensation for land and rights.

33. Under Compensation for land and rights, Rs. 64,701 have been expended. This includes Rs. 63,500 paid for the purchase of about ~~900~~ acres of forest land from private persons in the Terai of the Darjeeling district; most of this forest land had been granted under the waste land grant rules, and had now to be purchased by Government, in order to provide a sufficient area of forest chiefly to supply the requirements of the tea-planting interests in the Terai.

6/64.

34. The amounts paid and charged in the accounts of the year for rent of leased forests, and to shareholders in forests managed by Government were as follows:— Payment of rent for leased forests.

	Rs.
North-Western Provinces (for lease of forests in Native Garhwal)	10,351
Punjab (includes payments for the lease of the forests in Bashahr and Chamba, to shareholders in Kalesar, and half seignorage on account of timber cut in the Hazara forests)	34,653
Assam	50
Berar (annual payment to Melghat Rajas)	17,120
Total	62,174

There is no great change in these amounts from year to year.

Protection from fire.

35. The following figures show the area successfully protected from fire during the year. In the North-Western Provinces and Oudh, and in Assam, the area has diminished, but in the other provinces there has been a satisfactory increase. Summary.

Area of forest protected from fire in 1878-79.

Provinces.	Acres.	Total outlay from commencement.	Date to which expenditure has been incurred.	Year when fire conservancy commenced.
		Rs.		
Bengal	1,06,754	6,671	1st May 1879	1872
North-Western Provinces and Oudh	3,01,291	67,564	30th June „	1872
Punjab	...	...	...	...
Central Provinces	6,91,363	88,536	30th June „	1864
British Burma	71,322	54,790	30th June „	1868
Coorg	1,29,478	6,348	31st May „	1876
Ajmere	44,659	2,818	30th June „	1874
Assam	33,259	14,443	30th June „	1873
Total	13,78,126	2,41,170	.....	...
Mysore	1,05,013	19,527	30th April 1879	1874
Berar	5,55,037	13,304	30th June „	1870
Grand Total	20,38,176	2,74,001	.....	...

As in previous years, the figures here recorded represent the area protected to the end of the dry season of 1879.

36. In Bengal and Assam the season was exceptionally dry; the rain in March and April, which is generally abundant and greatly facilitates protection, having failed altogether. In Bengal the season was so dry that not in the Terai only, but also throughout the hills, up to an elevation of 10,000 feet, large tracts of forest were burnt. In November 1879, the writer of the present Review visited the forests of the Chebu Lama's property below Tonglo, which overhang the little Rungeet valley, and found that over vast areas the thick and tall underwood of bamboo, which is common in these forests was burnt and the trees seriously damaged. Tea-houses and factories and many acres of tea-plantations, were destroyed by these jungle-fires in the Darjeeling hills, and immense damage was done. Bengal.

The forest and plantation of Bamunpokri near Pankabari were saved through the energy of the Assistant Conservator and the forester in charge; and the Conservator reports that besides Bamunpokri there was hardly an acre of jungle land in the Terai or lower hills, whether the property of Government or not, that was not burnt over during the year. In the Western Duárs more success was attained, and portions of the Muraghat, Buxa, and Bholka forests, which had been protected in previous years, were again saved this season. In addition to them, the Tondu and Apalchand forests were taken in hand, and were partially protected. This partial success, in spite of the singularly unfavourable season, was chiefly due to the adoption of a new and improved system, which was suggested by the writer of the present review on a tour of inspection

through those forests in January 1879. The chief feature of this system is that savannahs and other grass lands which surround the forests or are enclosed in them, are burnt early in the season, at a time when the grass inside the forest is not yet sufficiently dry to burn.

The operations for carrying out this plan were undertaken too late in the season to secure more than a partial success, but this plan, combined with a system of fire traces along roads and paths, and along boundary lines, and the entertainment of fire-watchers during the hot season will doubtless eventually succeed in Bengal, as well as Assam. In the Chittagong Division the Sitapahar forest and plantation were saved.

Hill forests of Darjeeling.

37. The return of the areas protected from fire in Bengal does not include any of the forests in the hills, which are evergreen and usually so damp that fires do not enter them. But the experience of last season has shown that special arrangements must be made in order to ensure their protection. The Conservator justly remarks that the thin-barked oaks, chestnuts, and magnolias suffer much more than the thick-barked trees of the terai; while the heavy masses of dry moss on the branches of the trees attract the fire to the tops and smoulder long, the result in most cases being the death of the tree.

What is required chiefly in these forests is to clear camping grounds which should be fire-traced, and to prevent camping at other than these fixed localities. In this direction a commencement has been made by the Conservator.

Assam.

38. In Assam the sál forests of the Eastern Duárs were burnt with the exception of small areas in the Sidli and Guma forests. In the sal forests of the Kamrup District, also, fires were extremely severe, but the Jara forest, the greater part of Barduar, and portions of some of the other forests were saved. The season was doubtless unusually dry in Assam, and the westerly winds were unusually fierce, but the dry season of 1878 was also said to have been unusually dry, and it is evident that such unusually dry seasons are not altogether uncommon in Assam and Bengal, and the possibility of their occurrence must be taken into account by Forest officers when making arrangements for fire protection.

The results of these operations in Assam may be stated as follows. In 1878 the area actually protected aggregated 60,028 acres. In the year under review the protection of 90,342 acres was attempted, but the larger portion of this area failed, and at the close of the dry season of 1879 only 33,259 acres of the area attempted to be protected had been saved. Fortunately, the forests in the upper part of the Assam valley are mostly evergreen, and the fires of the dry season do not, as a rule, enter them.

North-Western Provinces and Oudh.

39. In the North-Western Provinces and Oudh the results have been most unfavourable—

Area protected in	1877	331,357	acres
„ „	„ 1878	344,658	„
„ attempted	„ 1879	392,012	„
„ protected	„ 1879	301,291	„

In the Oudh circle the greater part of the Dudua home block, where 15,000 acres had been continuously protected since 1872, was burnt, and the following is an extract from the Conservator's report on the subject :—

"Several fires were communicated to the Dudua home block about January and February from the fires of graziers outside the block; these, even in the cold weather, were extremely difficult to put out, owing to the mass of dry vegetation in the long grass. In May 1879, when a strong hot wind was blowing, one of the fire conservancy watchers in the south block, alluded to in paragraph 32 of last year's report, set his razai on fire from a spark, and, to save the hut he was in, threw the razai outside; the sparks caught the high grass near, and the fire spread with fearful rapidity, setting fire to the grass on the other side of the Suheli in the lower sissu closed block. The bed of the Suheli here is over 100 feet in width, only sand and water, without a blade of grass on it. All attempts were in vain to stop the fire, and I regret to state that the whole of the lower closed block was burnt, and all but 5 square miles of the Dudua home block was burnt over. The improvement feelings were fortunately saved. This is a great loss, but the benefit derived from the closing has not been entirely lost, many young trees having come up and being still on the ground that would not have come up without conservancy, and in natural forests, the sál growing thickly in clumps. Where the young trees were close together and the grass killed down, the injury has been much less than where the young trees were scattered. This fire communicating with grass over a clear space of over 100 feet shows that the wind carried lighted grass far over that distance."

In the Central Circle, out of 200,700 acres, the protection of which was attempted, 67,530 acres failed; and only 133,163 acres were saved. Unlike the statements appended to the Oudh and School Circle reports, those submitted by Mr. Greig give no information regarding the particular forests which were burnt, and those which were saved. The causes assigned for the failures are the unusual dryness of the season and the return of the cholera-stricken pilgrims from the Hurduár fair through the forests.

In the School Circle, the chief failure in the sâl forests of the Dun was the Thano forest, which had been protected since 1877, and about 2,400 acres in the hills of the Jaunsar division.

40. In the Punjab destructive forest fires are reported to have occurred in Hazara, Rawulpindi, Kulu, and at Kalesar. Fires being the exception in the Punjáb forests, and not the rule as in most forests of other provinces, no return of forests specially protected from fire is appended to the annual report, as is customary in other provinces. But of late years destructive forest fires have frequently been reported; and it will in future be necessary to record in the annual report a statement of all areas burnt during the year. **Punjab.**

41. In the Central Provinces steady and most praiseworthy progress continues to be made in this respect. Besides the areas protected in previous years, operations were commenced in several additional areas; the totals are as follows:— **Central Provinces.**

Area	protected	in	1877	504,824	acres.
„	„	„	1878	575,304	„
„	attempted	„	1879	749,319	„
„	protected	„	1879	691,363	„

These are the areas, in first class reserves, which aggregate 1,600,640 acres; so that if progress continues to be made as at present, one-half of the area of first class reserves will soon be under protection. Considering that fire conservancy was only commenced in 1864, and that formerly every acre of these vast forests was burnt once or twice a year, this success is most remarkable and most creditable to the local Forest officers.

Fire protection has also commenced in some of the second class reserves. Thus, in the Damoh District, Colonel Thomson has for some time past placed certain selected blocks, aggregating about 21,000 acres, under more or less strict fire protection. These arrangements have not in all cases been successful, but the improvement of the forests through this measure has been very considerable.

42. In Burma the figures are as follows:— **Burma.**

	Protected in 1877.	Protected in 1878.	Attempted in 1879.	Protected in 1879.
Tenasserim circle	27,360	30,634	32,970	31,770
Pegu circle	30,376	37,564	41,897	39,552
Total	57,736	68,198	74,867	71,322

There has thus been steady progress, although the progress has been slow. The failures which merit notice were 25 acres in the Magâyee plantation, and the Kyetpyoogan plantation (683 acres), which again was burnt.

43. In Coorg large additions have been made to the protected area. The figures are as follows:— **Coorg.**

Area	protected	in	1877	16,106	acres.
„	„	„	1878	16,315	„
„	attempted	„	1879	1,38,061	„
„	protected	„	1879	1,29,478	„

This is satisfactory. The total demarcated area of Government forests is 189,166 acres.

44. In Berar the whole of the demarcated State forests were protected, except portions of Garu-Matergaon, Ghatbori, Penganga, and Kinwat, where protection failed partially. **Berar.**

The greater part of the Bairagar reserve in the Melghat has now been continuously protected from fire since 1870, and the effect of the better forest growth in regulating the surface drainage is exceedingly marked. This appears from the following extract of a report by Mr. Watts, the Assistant Engineer, on

the road now under construction, which will lead from Pili in the Bairagarh reserve, to Ellichpur.

"During the late heavy rain, *viz.*, 4 inches in 24 hours in the beginning of June, 1879, I had four bridges in construction in the Bairagarh Reserve on the Ellichpur-Pili Road, *viz.*, Nos. 18, 19, 22 and 23. The foundations of these bridges were not finished, and I expected much damage to them by the early rains. Much to my surprise I found that when the rain was finished none of the nullahs over which these bridges are being constructed had been in flood, and no damage had been done to the foundations. In the unreserved forests between Sirasban and Ellichpur all the nullahs had been in flood, and I attribute the escape of the foundations of the bridges in the reserve to the rain having been absorbed by the old fallen leaves and grass, thus showing the protective power of forests to bridges in preventing sudden heavy floods"

Outlay

45. The outlay on fire protection, as entered in the accounts of the year, was Rs. 53,491, and the area protected aggregated 20,38,176 acres. Thus the average rate for 1,000 acres was Rs. 27, which compares favourably with the rate of previous years, *viz.*, Rs. 66 in 1875-76, Rs. 30 in 1876-77, and Rs. 29 in 1877-78. In some provinces, such as the Pegu circle of Burma and the North-Western Provinces and Oudh, the rate is still exceptionally high.

	Area.	Outlay.	Rate per 1,000 acres.
	Rs.	Rs.	Rs.
Burma, Tenasserim Circle	31,770	900	28
„ Pegu „	39,552	7,626	193
North-Western Provinces, Oudh Circle . .	1,02,955	4,799	46
„ „ Central Circle . .	1,33,163	4,928	37
„ „ School Circle . .	65,173	3,853	59

The outlay here shown is the amount entered in the accounts of the official year.

Plantations and other reproductive measures.

Summary.

46. In the Review for 1877-78, the difference between regular plantations and reproductive works for the improvement of the forests was explained. In both respects considerable progress has been made during 1878-79. The following statement exhibits the extension of the regular plantations.

Area of Plantations in 1878-79, and extensions made during the year.

Provinces.	Area.				Expenditure.		
	At the commencement of the year.	Added during the year.	Excluded during the year.	At the close of the year.	Previous.	During the year.	Total.
	Acres.	Acres.	Acres.	Acres.	Rs.	Rs.	Rs.
Bengal	636	207	...	843	64,637	13,153	77,790
North-Western Provinces and Oudh	1,921	51	1	1,971	30,921	3,724	34,645
Punjab	15,420	1,683		17,103	7,00,255	69,461	7,69,716
Central Provinces	..	...	.	.	..	.	.
British Burma	3 339	.	...	3,339	2,76,565	11,020	2,87,585
Coorg.	396	10	..	406	26,798	2,111	28,909
Ajmere	363	71	...	434	25,742	2,428	28,170
Assam	774	186	...	960	30,218	13,374	43,592
Total . . .	22,849	2,208	1	25,056	11,55,136	1,15,271	12,70,407
Mysore	3,504	482	...	3,986	1,16,014	20,662	1,36,676
Berar	1,649	344	...	1,993	37,808	3,219	41,027
Total . . .	5,153	826	...	5,979	1,53,822	23,881	1,77,703
Grand Total . . .	28,002	3,034	1	31,035	13,08,958	1,39,152	14,48,110
Deduct Revenue	...	...	...	...	81,212	14,100	95,312*
Net Outlay on Plantations . .	...	...	...	...	12,27,746	1,25,052	13,52,798

* In the Punjab the revenue realized from plantations during the year was Rs. 14,100; and from the commencement Rs. 95,312. No revenue is recorded as realized from plantations in other provinces.

In the case of the following provinces the figures representing the area and cost at the commencement of the year, do not agree with the figures entered for the same date in the returns for 1877-78.

The area at the close of 1877-78 was said to be 637 acres, on which Rs. 64,748 had been spent; but from this has been deducted one acre of bamboo plantations in the Sundarbans on which Rs. 110 were spent, the plants being all dead. Bengal

Owing to corrections in the return, the area at the close of 1877-78 which was said to be 368 acres has been altered to 363 acres; and to the cost, *viz.*, Rs. 23,698, have been added general charges up to the 31st March 1875, which raises it to Rs. 25,742. Ajmere

The area at the close of 1877-78 was said to be 1,449 acres: 200 acres in the Kinwat plantations had, however, been omitted; so that the correct area was 1,649 acres, and this figure has been shown as the area at the commencement of 1878-79. Hyderabad Assigned Districts.

47. The chief extensions made in Bengal were 112 acres in the hills near Darjeeling, and 80 acres at Sitapahar in Chittagong. Bengal.

48. In the Punjab the chief extensions were 1,337 acres in Changa Manga, and 250 acres in Kot Lakhpat. But, besides these regular plantations, much work has been done in re-stocking denuded areas, the chief of which is the work in the Pabbi Rakh, which was noticed in last year's review. As in previous years the return appended to the Punjab report consists of two portions—the area in the plantation division, and that in other divisions, the totals being as follows: Punjab

	On 1st April 1878.		During 1878-79.		On 31st March 1879.	
	Area acres.	Cost Rs.	Area acres.	Cost Rs.	Area acres.	Cost Rs.
Other Divisions	2,245½	11,992	90½	2,966	2,336	14,958
Plantation Division	15,420	7,00,255	1,683	69,461	17,103	7,69,716
TOTAL	17,665½	7,12,247	1,773½	72,427	19,439	7,84,674

The revenue realized from the plantation division during the six years from 1873-74 to 1877-78 was Rs. 81,212; and that for 1878-79 was Rs. 14,100. The net outlay as entered in the accounts of the year has, therefore, been as follows:—

	Outlay. Rs.	Receipts. Rs.	Net Outlay. Rs.
From 1873-74 to 1877-78	7,00,255	81,212	6,19,043
During 1878-79	69,461	14,100	55,361
Total	7,69,716	95,312	6,74,404

49. The annual thinnings in Changa Manga and in the Sailaba plantations near Lahore have now become very extensive. Thus, the thinnings in 1878-79 yielded 686,343 cubic feet of stacked wood, in addition to 202,959 cubic feet remaining on hand from the previous year. These plantations have thus commenced to yield a very considerable annual supply of fuel, and this supply will eventually be a matter of some importance, for it is by no means certain that the Punjab Northern State Railway will not find it an advantage to use fuel instead of coal, and if this is the case, it seems not unreasonable to expect that eventually some of the wood produced on these plantations may be consumed by the Punjab Northern State Railway, unless other customers can afford to pay higher rates. These plantations are chiefly stocked with sissu, and their ultimate annual yield, after they have attained maturity, is estimated to be very considerable. Thinning of plantations

50. Coal as locomotive fuel has certain advantages over wood, which will often make Railway officers inclined to prefer its use, although the cost of coal may be greater. Nevertheless, the question of wood consumption on the Punjab Northern State Railway is mainly one of cost. It has been calculated that on the Punjab Northern State Railway, with coal at Rs. 31-8 per ton in Lahore, and with wood at Rs. 30 per 100 maunds, the cost of coal per train mile was 6·9 annas as against 5·12 annas cost of wood, and that the small difference in favour of wood is counterbalanced by savings in establishments, lessened loss by risk of fires, lessened detention of trains at wood depôts, and other circumstances. The result of this and of the increasing difficulty in procuring wood has been that, while in the half-year ending the 30th June 1878, 1,549 Wood as locomotive fuel.

tons of coal were used as against 1,344 tons of wood, the consumption in the corresponding half-year of 1879 was 3,427 tons of coal as against 1,698 tons of wood, yet coal is now costing the Government Rs. 34 a ton on the Punjab Northern State Railway.

The question of extending these plantations, or of establishing new plantations north of Lahore, must, to a great extent, depend upon the rates at which the wood produced on such plantations can be delivered at the principal stations of the Northern State Railway and upon the cost of coal at those stations. It may safely be assumed that the price of Bengal coal at the pit's mouth will not materially increase at present, and as regards the cost of wood, 2 pies per ton per mile may be taken as the rate chargeable for haulage to the place of consumption. Again, the price of wood per ton should not exceed one-third of what Bengal coal would cost at the place of consumption.

Burma teak plantations

51. From Burma no extension of the regular plantations is reported, but the areas planted with teak in Toungyas or hill clearings by the Karens have increased considerably, and it appears from the report that the total area is as follows:—

	To end of 1877-78.	In 1878-79.	Total.
	Acres.	Acres.	Acres.
Tenasserim	347	182	529
Pegu	1,289	375	1,664
Total	1,636	557	2,193

This system of raising teak is effective and economical; its introduction on a large scale is due to Major Seaton, the Conservator of Forests in the Tenasserim circle, and provided the areas planted are situated in forests which are protected from fire, its extension should by all means be arranged.

The area of the regular plantations is 3,339 acres, which, with the Toungya plantations, makes the total area planted with teak 5,532 acres. These areas are mostly stocked with teak, but they do not consist of large blocks, and they are mostly distributed over the forests in small belts and patches, seldom exceeding 600 acres, and sometimes only a few acres. Eventually these planted areas will not only themselves furnish timber, but will serve to increase the proportion of teak in the adjoining forest by the spread of self-sown seedlings. Instead of large forests of pure teak there will thus be mixed forests, in which teak forms a large proportion, and thus the natural growth of teak in the forests will be imitated.

Experimental cultivation of caoutchouc trees.

52. A series of experiments has been commenced and is being continued in Burma in cultivating different species of caoutchouc-producing trees. The India Rubber tree of Assam (*Ficus elastica*) has, for some years past, been cultivated at Magayee in the Rangoon district. But from what is stated in the report it is evident that the tree does not thrive, partly perhaps because it has been planted under shade, partly because the long and hot dry season of Pegu is not favourable for its development. Nor is this to be wondered at; for its home is the comparatively cool and moist climate of Assam and the adjoining countries, and in India it is not indigenous south of 24° north latitude.

The different species which produce caoutchouc in South and Central America are cultivated as an experiment near Mergui, but sufficient experience has not yet been gained to form an idea as to their probable success in that part of Burma.

Central Provinces

53. In the returns appended to the Report of the Central Provinces the entries regarding the area of the plantations are blank, but a vast amount of good and useful work has, nevertheless, been accomplished in those Provinces in improving the forests by sowing and planting. Thus, in the Korai forest of the Seoni district, an area of 233 acres has now been stocked by sowing and planting with teak and shisham (Blackwood), and similar operations have been made in other districts. The Conservator's report is replete with information regarding the cultural operations undertaken in different parts of the forests. Besides these more recent undertakings there are other older plantations, chiefly of teak, in the Central Provinces. In one of them, in the Machna valley of the Bowergarh reserve, which is of pure teak, the Conservator reports having

made sowings of other kinds of trees, in order to effect a mixture which will doubtless tend to improve the growth of teak.

The Conservator also gives an interesting account of the forest garden at Telinkheri, near Nagpore, where systematic experiments with indigenous and exotic trees are made. This estate supports itself through the sale of fruit and other produce.

Experimental cultivation of exotic trees.

54. Of the exotic trees which are cultivated by way of experiment, mahogany is the most important, and its success seems not improbable, though it is too early yet to form final conclusions upon the subject. Mahogany is also cultivated, as an experiment, in Burma and the Chittagong district of Bengal. The tree is known to thrive well near Calcutta, and every effort should be made to cultivate it in those forest districts where climate and other circumstances are favourable.

Assam.

55. In Assam the chief extensions made during the year were 112 acres stocked with caoutchouc in the Charduar plantation of the Darrang district, and 20 acres with teak at Kalsi in the Kamrup district. The area of the last-named plantation hitherto entered in the returns as 73 acres, has, on an accurate survey being made, been ascertained to measure 45 acres more, so that with the extension made during the year the area entered at the close of 1878-79 is 138. An extension of 9 acres was also made in the caoutchouc plantation at Kalsi, and this, as well as the caoutchouc plantation in the Charduar forest, have been enclosed by substantial fences in order to protect them against deer which have hitherto been most destructive, especially in September and October.

An important experiment was carried out with considerable success in the Nambor forest by sowing in the forest the seed of nahor (*Mesua ferrea*) and ajhar (*Lagerstræmia Reginæ*). The nahor grows well under shade, while the ajhar requires light.

Mysore.

56. In Mysore the statements appended to the report exhibit an extension of 482 acres in the Nandydroog division, but no further information is entered in the report regarding the additional area planted.

Berar.

57. In Berar 434 acres have been planted in the Kinwat reserve with bamboo and teak, and 110 acres with teak in the Bairagarh reserve. The chief Forest officer of Berar reports that in the last-named reserve the natural reproduction of teak is increasing so rapidly that there is no longer any real necessity for forming artificial plantations, which will therefore in future be confined entirely to open spots, containing no seed-producing trees that are not likely to become covered with natural growth. Some of the reserves in South Berar are stocked with anjun (*Hardwickia binata*), a tree which in that part of India does not seed regularly every year, but which produced seed freely in 1877, and has, as reported by the Deputy Conservator, produced a profusion of seedlings in the Garu Matergaon forest.

Outlay.

58. The aggregate area of the plantation in the different provinces at the close of the year is reported as 31,035 acres, upon which the total outlay from the commencement has been Rs. 13,52,798, or Rs. 43 per acre.

Forest Survey.

Original surveys and valuations.

59. As regards original surveys the chief work lay in the Government forests of the Bhabar and outer hills of Kumaun. The forests near Ramkhet, and some of those in the Bareilly district, were also surveyed, and additions were made to the previous surveys of the Jaunsar forest. All this is in the territories subject to the control of the Government of the North-Western Provinces and Oudh; and with regard to the work done by him in those territories the Superintendent of Forest Surveys is under the orders of the Local Government. At the request of the Punjab Government, valuations have also been undertaken by the forest survey of forests situated in certain Native States under the political control of that Government; and for other provinces a variety of work was done in the preparation of maps, &c.

Forest survey to be used for training probationers and apprentices.

60. During the year under review Captain Bailey, the Superintendent of Forest Surveys, was, in addition to his duties as such, appointed as Conservator of the Forest School Circle in the North-Western Provinces and Director of the Forest School. The intention is to employ the opportunities which the operations of the forest survey afford for the training in surveying of the

tons of coal were used as against 1,344 tons of wood, the consumption in the corresponding half-year of 1879 was 3,427 tons of coal as against 1,698 tons of wood, yet coal is now costing the Government Rs. 34 a ton on the Punjab Northern State Railway.

The question of extending these plantations, or of establishing new plantations north of Lahore, must, to a great extent, depend upon the rates at which the wood produced on such plantations can be delivered at the principal stations of the Northern State Railway and upon the cost of coal at those stations. It may safely be assumed that the price of Bengal coal at the pit's mouth will not materially increase at present, and as regards the cost of wood, 2 pies per ton per mile may be taken as the rate chargeable for haulage to the place of consumption. Again, the price of wood per ton should not exceed one-third of what Bengal coal would cost at the place of consumption.

Burma teak plantations

51. From Burma no extension of the regular plantations is reported, but the areas planted with teak in Toungyas or hill clearings by the Karens have increased considerably, and it appears from the report that the total area is as follows:—

	To end of 1877-78.	In 1878-79.	Total.
	Acres.	Acres.	Acres.
Tenasserim	347	182	529
Pegu	1,289	375	1,664
Total	1,636	557	2,193

This system of raising teak is effective and economical; its introduction on a large scale is due to Major Seaton, the Conservator of Forests in the Tenasserim circle, and provided the areas planted are situated in forests which are protected from fire, its extension should by all means be arranged.

The area of the regular plantations is 3,339 acres, which, with the Toungya plantations, makes the total area planted with teak 5,532 acres. These areas are mostly stocked with teak, but they do not consist of large blocks, and they are mostly distributed over the forests in small belts and patches, seldom exceeding 600 acres, and sometimes only a few acres. Eventually these planted areas will not only themselves furnish timber, but will serve to increase the proportion of teak in the adjoining forest by the spread of self-sown seedlings. Instead of large forests of pure teak there will thus be mixed forests, in which teak forms a large proportion, and thus the natural growth of teak in the forests will be imitated.

Experimental cultivation of caoutchouc trees.

52. A series of experiments has been commenced and is being continued in Burma in cultivating different species of caoutchouc-producing trees. The India Rubber tree of Assam (*Ficus elastica*) has, for some years past, been cultivated at Magayee in the Rangoon district. But from what is stated in the report it is evident that the tree does not thrive, partly perhaps because it has been planted under shade, partly because the long and hot dry season of Pegu is not favourable for its development. Nor is this to be wondered at; for its home is the comparatively cool and moist climate of Assam and the adjoining countries, and in India it is not indigenous south of 24° north latitude.

The different species which produce caoutchouc in South and Central America are cultivated as an experiment near Mergui, but sufficient experience has not yet been gained to form an idea as to their probable success in that part of Burma.

Central Provinces

53. In the returns appended to the Report of the Central Provinces the entries regarding the area of the plantations are blank, but a vast amount of good and useful work has, nevertheless, been accomplished in those Provinces in improving the forests by sowing and planting. Thus, in the Korai forest of the Seoni district, an area of 233 acres has now been stocked by sowing and planting with teak and shisham (Blackwood), and similar operations have been made in other districts. The Conservator's report is replete with information regarding the cultural operations undertaken in different parts of the forests. Besides these more recent undertakings there are other older plantations, chiefly of teak, in the Central Provinces. In one of them, in the Machna valley of the Bowergarh reserve, which is of pure teak, the Conservator reports having

made sowings of other kinds of trees, in order to effect a mixture which will doubtless tend to improve the growth of teak.

The Conservator also gives an interesting account of the forest garden at Telinkheri, near Nagpore, where systematic experiments with indigenous and exotic trees are made. This estate supports itself through the sale of fruit and other produce.

Experimental cultivation of exotic trees.

54. Of the exotic trees which are cultivated by way of experiment, mahogany is the most important, and its success seems not improbable, though it is too early yet to form final conclusions upon the subject. Mahogany is also cultivated, as an experiment, in Burma and the Chittagong district of Bengal. The tree is known to thrive well near Calcutta, and every effort should be made to cultivate it in those forest districts where climate and other circumstances are favourable.

Assam.

55. In Assam the chief extensions made during the year were 112 acres stocked with caoutchouc in the Charduar plantation of the Darrang district, and 20 acres with teak at Kalsi in the Kamrup district. The area of the last-named plantation hitherto entered in the returns as 73 acres, has, on an accurate survey being made, been ascertained to measure 45 acres more, so that with the extension made during the year the area entered at the close of 1878-79 is 138. An extension of 9 acres was also made in the caoutchouc plantation at Kalsi, and this, as well as the caoutchouc plantation in the Charduar forest, have been enclosed by substantial fences in order to protect them against deer which have hitherto been most destructive, especially in September and October.

An important experiment was carried out with considerable success in the Nambor forest by sowing in the forest the seed of nahor (*Mesua ferrea*) and ajhar (*Lagerstræmia Reginæ*). The nahor grows well under shade, while the ajhar requires light.

Mysore.

56. In Mysore the statements appended to the report exhibit an extension of 482 acres in the Nandydroog division, but no further information is entered in the report regarding the additional area planted.

Berar.

57. In Berar 434 acres have been planted in the Kinwat reserve with bamboo and teak, and 110 acres with teak in the Bairagarh reserve. The chief Forest officer of Berar reports that in the last-named reserve the natural reproduction of teak is increasing so rapidly that there is no longer any real necessity for forming artificial plantations, which will therefore in future be confined entirely to open spots, containing no seed-producing trees that are not likely to become covered with natural growth. Some of the reserves in South Berar are stocked with anjun (*Hardwickia binata*), a tree which in that part of India does not seed regularly every year, but which produced seed freely in 1877, and has, as reported by the Deputy Conservator, produced a profusion of seedlings in the Garu Matergaon forest.

Outlay.

58. The aggregate area of the plantation in the different provinces at the close of the year is reported as 31,035 acres, upon which the total outlay from the commencement has been Rs. 13,52,798, or Rs. 43 per acre.

Forest Survey.

Original surveys and valuations.

59. As regards original surveys the chief work lay in the Government forests of the Bhabar and outer hills of Kumaun. The forests near Ramkhet, and some of those in the Bareilly district, were also surveyed, and additions were made to the previous surveys of the Jaunsar forest. All this is in the territories subject to the control of the Government of the North-Western Provinces and Oudh; and with regard to the work done by him in those territories the Superintendent of Forest Surveys is under the orders of the Local Government. At the request of the Punjab Government, valuations have also been undertaken by the forest survey of forests situated in certain Native States under the political control of that Government; and for other provinces a variety of work was done in the preparation of maps, &c.

Forest survey to be used for training probationers and apprentices.

60. During the year under review Captain Bailey, the Superintendent of Forest Surveys, was, in addition to his duties as such, appointed as Conservator of the Forest School Circle in the North-Western Provinces and Director of the Forest School. The intention is to employ the opportunities which the operations of the forest survey afford for the training in surveying of the

apprentices and probationers, who will be educated at the Central Forest School. At the same time it has been proposed to contract the operations of the forest survey, and accordingly the amount sanctioned for 1879-80 has been fixed at Rs. 50,000, while that for 1880-81 has been fixed at Rs. 40,000. The outlay during the official year 1878-79 was Rs. 60,325.

Outlay on Demarcation and Improvement of Forests.

Outlay.

61. The outlay during the year on demarcation and improvement of the forests, including plantations, as recorded under the head A VIII has been as follows, not including any establishment charges.

Provinces.	Demarcation, Improvement and Extension of Forests—A. VIII.						
	Demarcation.	Compensation for land and rights.	Surveys and working plans.	Plantations.	Protection from fire.	Other works.	Total.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs	Rs.
Bengal	6,918	63,800	30	13,165	2,453	511	86,877
North-Western Provinces and Oudh.	6,096	...	4,410	2,180	13,581	11,712	37,979
Punjab	7,100	329	3,853	41,931	31	12,774	66,018
Central Provinces	485	...	647	2,637	10,863	4,427	19,059
British Burma	11,780	575	237	12,997	8,526	2,575	36,640
Coorg	1,145	...	...	2,111	3,233	...	6,489
Assam	4,024	...	3,862	13,375	4,066	653	25,980
Ajmere	27	...	...	2,694	581	868	4,170
Surveys	...	...	6,696	..	...	...	6,696
Total	37,525	64,704	19,735	91,090	43,334	33,520	2,89,908
Mysore	1,289	...	...	23,167	6,998	52	31,506
Berar	1,330	...	...	4,039	3,159	526	9,054
Grand Total	40,144	64,704	19,735	1,18,296	53,491	34,098	3,30,468

Increase of outlay.

62. The outlay under this head has risen steadily during the last five years, thus—

	Rs.
1874-75	2,20,744
1875-76	2,47,226
1876-77	2,61,560
1877-78	2,67,666
1878-79	3,30,468

The outlay in the year under review was exceptionally high on account of the payment of Rs. 63,500 in Bengal for the purchase of forest land from private persons. In Mysore also the outlay was large, having been Rs. 31,506 against Rs. 24,704 in 1877-78. And in Assam it was Rs. 25,980 against Rs. 16,192 in 1877-78. Save in these exceptional cases, the increase in the expenditure on the demarcation and improvement of the forests which certainly are the most important among the objects aimed at by Forest Administration in India, has been slow but steady, and as long as the state of the forest revenue permits the continuance of this outlay this is satisfactory, and is as it should be.

Communications and Buildings.

Summary.

63. The outlay for communications, buildings and other works, charged in the accounts of the year has been as follows :—

Provinces.	Communications and Buildings—A. VII.			
	Roads and bridges.	Buildings.	Other works.	Total
	Rs.	Rs.	Rs	Rs.
Bengal	2,398	5,955	9	8,362
North-Western Provinces and Oudh	40,328	19,191	4,120	63,639
Punjab	14,138	5,238	752	20,128
Central Provinces	2,070	1,033	1,430	5,433
British Burma	119	11,773	1,739	13,631
Coorg	84	780	...	864
Assam	2,118	4,825	...	6,943
Ajmere	..	311	556	867
Surveys	...	...	...	...
Total	61,255	50,006	8,606	1,19,867
Mysore	202	788	...	990
Berar	203	1,280	472	1,955
Grand Total	61,660	52,074	9,078	1,22,812

64. In Bengal 18½ miles of new roads have been made and numerous rest-houses have been completed or commenced. Bengal.

65. In the North-Western Provinces and Oudh the outlay has been Rs. 63,639 against Rs. 59,000 in 1877-78. North-Western Provinces and Oudh.

In the Central Circle Rs. 19,987 were expended upon roads and bridges, Rs. 5,450 on buildings and Rs. 87 on other works. In Kumaun a cart-road, 4 miles in length, was built for the export of timber; in Garhwal two large sheds for storing timber at the Kalagarh and Ramnagar timber depôts were erected, and three new cart-roads, aggregating 37 miles in length, were constructed.

In the Oudh Circle Rs. 8,754 were spent upon roads and bridges; Rs. 12,856 upon buildings, and Rs. 3,953 upon other works. In the Kheri forests 16½ miles of new road were made; 24½ miles in course of construction were finished, and 170 miles of old road were repaired. Numerous bridges were built and maintained, several rest-houses were completed, and wells and tanks were made. Similar progress is reported from the other divisions.

In the School Circle Rs. 11,587 were spent on roads and bridges; Rs. 884 on buildings and Rs. 100 on other works. In Jaunsar the chief works were a low level road along the Tonse river, 15 miles long, constructed to facilitate access during the winter months to the Chir forests in the Tons river; and 86 miles of inspection paths. In the Dehra Dun Division 16 miles of ten feet export roads were made, and two rest-houses built.

66. In the Punjab the outlay was Rs. 20,128, of which Rs. 14,138 was for roads and bridges. The road to Khagan mentioned in the Review for 1877-78 was continued but not completed, and part of the cost of a road between Chamba and Barmaur was paid by the Forest Department. Punjab.

67. In the Central Provinces the outlay has been very moderate, being only Rs. 5,433, the chief work having been the improvement of the lines for the export of timber from the Banjar forest in the Mandla district. The Conservator reports that by means of this work the cost of carrying sâl timber from these forests to Jubbulpore will be reduced to the rate of 8 annas per cubic foot. Considering the distance and the natural difficulties of the route, this rate is very moderate. Central Provinces.

68. In Burma the outlay has been Rs. 13,631, of which Rs. 11,773 were for buildings, chiefly rest-houses in the forests. Burma, Assam, and other provinces.

In Assam Rs. 6,943 were expended, the chief work having been the continuation of the road along the southern boundary of the Charduar rubber plantation and the completion of the forest-house at Golaghât.

The work done in the other provinces in this respect calls for no remark.

69. The annual outlay on communications and buildings since 1874-75 has been as follows:— Outlay since 1874-75.

	Rs.
1874-75	1,02,294
1875-76	1,23,927
1876-77	1,19,701
1877-78	1,13,784
1878-79	1,22,812

There has thus been no great increase in the annual outlay on this account, nor is any such increase anticipated.

CHAPTER II.

MANAGEMENT OF GOVERNMENT FORESTS NOT INCLUDED WITHIN RESERVED FORESTS.

Unreserved or Protected Forests and Second Class Reserves in the Central Provinces.

70. In Bengal 1,925 square miles were gazetted as protected forests in the Sundarbuns, *viz.*, 1,875 square miles in the 24-Pargannahs, and 50 square miles Bengal.

in the Jessore district. The land included within these protected forests will, under definite rules, be available for the extension of cultivation, but Government retains the control of the forest growth upon it, until it is actually cleared and brought under the plough. The same revenue will be paid upon the wood and timber exported from such lands as is paid upon the wood and timber exported from the remainder of the protected forests.

In former forest reports 8 square miles in the Jalpaiguri and 5,100 square miles in the Chittagong Hill District were included under unreserved forest. These areas remain under management for the collection of revenue as heretofore, those in Jalpaiguri under the Forest Department, and those in Chittagong under the Deputy Commissioner, but they have not been declared protected forests under the Act, and they have, therefore, been excluded from the returns appended to the Report for 1878-79. Some correspondence has taken place regarding the Khoorda forest in the Poorce District of Orissa, and it is likely that this forest will be declared a protected forest under the Act.

North-Western Provinces and Oudh.

71. In the North-Western Provinces and Oudh 38 square miles have been declared protected forests in the vicinity of Naini Tal,; 59 near Ranikhet; and 3 in the Lalitpur District. But there are extensive areas of Government forest land in other districts, particularly in the hills of Garhwal and Kumaun and in the Terai, which are not included within the reserved forests, and which have not been declared protected forests under the Act.

Punjab

72. In the Punjab the area previously classed as reserved forests amounted to 3,791 square miles, and it has already been explained in the previous chapter that of this area only 791 square miles can legally be termed reserved forests. The remaining area is under the control of Government for purposes of forest conservancy, but it has neither been declared as reserved nor as protected forest. Outside this area are the forest lands in the Hazara district, which it is proposed under the Hazara Forest Regulation to declare village forests, to be protected and managed under the control of Government, but to be open to the villages concerned for the supply of their requirements.

Central Provinces.

73. In the Central Provinces it has already been explained that the forests formerly termed unreserved have now been classed as second class reserves. As already explained, the difference is this, that the first class reserves will be permanently maintained as forest, while those of the second class will be available for the extension of cultivation.

Management of second class reserves.

74. The second class reserves are under the management of the district officers, and in ten districts the district officers are aided by an officer of the superior Forest staff, under the organization described in paragraph 22 of the Review for 1877-78. Considerable progress has been made in the better management of these second class reserves. A few years ago they were all, or nearly all, worked under what was styled the commutation system, which consisted in this, that an annual rate was paid by each house-holder for the right of providing himself with grass, fuel, mohwa and other forest produce. In many districts these commutation licenses also included the right to cut bamboos and wood for building and agricultural implements. The system is extremely simple, and was at one time highly approved. But experience has shown that it led to great waste, there being no restriction as to the amount of forest produce removed by the holders of commutation licenses. Moreover, a system under which the poor and rich alike pay an equal rate, irrespective of the amount consumed by them, is unjust, and cannot be continued as a permanent arrangement.

Commutation system.

Consequently the commutation system has been abandoned in some and restricted in most districts. In Saugor commutation has been stopped, except in the case of villages surrounded by Government forest and a few poor villages on the border of the forest; and similar arrangements have been made in the Wardha, Chanda, Balaghat and other districts. In the more populous tracts of Chanda, commutation is restricted to fuel and grass; in the Seoni district it is restricted to fuel, grass, and fencing wood; while in Damoh the commutation licenses restrict the quantity of produce that may be removed.

License system

75. For the removal of forest produce other than that commuted for, licenses for fixed quantities at fixed rates are granted. The licenses have a fixed money value, the quantity and description of produce to which the licenses refer being represented by colours and signs, so as to be easily intelligible and to

diminish the possibility of fraud. This is the practice in the Nagpur and in portions of the Wardha, Chanda and other districts. In some districts the right to collect mohwa is leased out, and separate arrangements are made for grazing.

In the Hoshangabad district three different descriptions of licenses are issued, *viz.*, *first*, general licenses, which are designed to supply all that the great body of the people require from the forests and which are meant to cover a two-bullock cart-load of grass or wood for fuel, or sticks and thorns for fencing; *second*, special licenses, intended to cover all produce not obtainable under the general licenses, to be filled in according to the application, and which state the produce to be removed, the name of the licensee, rates of duty payable, and the period for which it was current; *third*, monthly licenses, for head loads of grass or fuel taken for sale to towns and markets. And besides these three kinds, there are separate grazing licenses. A similar system obtains in the Betul, Chindwara and Narsinghpur districts.

Potection of certain kinds.

76. In order to protect the more valuable kinds of trees in addition to teak, the cutting of them, particularly of saj or bija, without special sanction, is prohibited in the second class reserves of some districts; and with the view of giving rest to certain portions of the forests, such portions are closed, either entirely or against the cutting of bamboos, or certain kinds of trees. Thus, in some forest tracts of the Damoh district the growth of the bamboo had been so greatly restored by four years of protection against cutting that it was lately found possible, subject to certain restrictions, to re-open these blocks for the cutting of bamboos.

Revenue realized.

77. The revenue realized from the second class reserves in the Central Provinces is considerable, and is increasing steadily:—

	Receipts. Rs.	Charges. Rs.	Surplus. Rs.
1877-78	5,36,112	1,38,727	3,97,385
1878-79	6,29,909	1,73,976	4,55,933

From the above remarks regarding the arrangements under which this revenue is collected, it will be evident that no returns can be prepared showing the quantity of grass, fuel, bamboos, and other produce which under these arrangements are made available for the people. But the rates are exceedingly low, and the quantities supplied are very large. The Government forests, however, are not the sole sources of supply.

Malguzari Forests.

78. The ryots on zemindari estates mostly supply themselves from the forests on those estates; and in addition to these private forests, which are the property of the great landholders, there are extensive forests on malguzari estates which may justly be styled village forests; for these lands were at the time of settlement assigned to the malguzari estates for the good of the agricultural communities. It has, however, been reported on several occasions and in the report of the Central Provinces for the present year, that in some cases malguzars attempt strictly to preserve their village forests; that they sell the timber of those forests for their own benefit and force their ryots exclusively to resort to the Government forests, which, not being in accordance with the intentions of the settlement, can, as a matter of course, not be permitted. By the terms of their engagements malguzars are bound to allow their cultivators, without charge, all wood required for agricultural purposes from the village forests, and to permit them to graze their cattle on the village wastes without payment.

British Burma.

79. In British Burma the area of Government forests not included within the reserves comprises the greater half of the entire province. Burma is a forest country even to a greater extent than the Central Provinces, and therefore the inhabitants have up to date provided themselves with forest produce from the Government forests without any payment or restrictions whatsoever, save that teak is a Royal tree throughout the province, the cutting of which is prohibited, and that payment is required for certain reserved kinds of wood when cut for purposes of trade. There is no prospect as yet of effecting a systematic division of lands, such as has been made in the Central Provinces under which a suitable area was assigned to the agricultural communities, while a large extent of forest became the absolute property of Government. All therefore that has been done

as yet has been to set apart small areas of reserved forests in a few districts. The next step must certainly be to require the payment of revenue on all timber, bamboos, fuel and other forest produce exported from the Government forests for sale, and not for the requirements of the agricultural population.

Assam.

80. In Assam the total area of Government forests is reported to have been as follows: At the close of 1878-79—

	Square miles
Reserved forests	1,983
Protected forests	689
Government forests not included in above	5,400
Total	8,072

This is a very small area, considering that the total area of the province within the inner line is 45,302 square miles. But a very large extent of forest land in Assam is not the property of Government, but of private persons. Thus, in the Goalpara district alone about 520 square miles, or somewhat more than one-half the Government land in that district, is included within zemindari estates; in the other districts about 550 square miles of forest land are the private property of tea-planters, and in the Khasi hills all forests are the property of the village communities.

Although, therefore, Assam is as much a forest country as the Central Provinces, yet the extent of Government forest is much smaller, and hence there is much less prospect of a large forest revenue than there is in the Central Provinces.

Berar

81. The total area of the Hyderabad Assigned Districts is 17,000 square miles, of which 11,123 square miles were (in 1877) cultivated, while 6,605 square miles were waste and forest. Of the last-named area 4,463 square miles are classed as Government forest, *viz.*,—

	Square miles
Demarcated State Forests	866
Reserved District Forests	500
Unreserved District Forests	3,097
Total	4,463

The general policy intended to be pursued in the management of these different classes of Government forests is to maintain permanently, and to protect and improve the State forests and reserved district forests. On the other hand, the lands designated as unreserved district forests will be available for the extension of cultivation and for such additions to the forests intended to be permanently maintained as such, as it may from time to time appear expedient to make. Meanwhile, while the State forests and District reserves are protected and improved, the unreserved forests must be utilized to supply the wood, bamboos, grass, and other forest produce required by the agricultural population. Hence, as in the Central Provinces, the supply of forest produce and the revenue are chiefly derived from the unreserved forests. The gross revenue yielded in 1878-79 by these different classes of forests stands as follows:—

	Rs
Reserved, State and District forests	73,026
Unreserved Forests	212,643
Total	285,669

CHAPTER III.

PROTECTION OF GOVERNMENT FORESTS.

82. The following statement shows the number of prosecutions for breaches of forest rules during 1878-79 in the different provinces :— Summary.

Provinces.	Number of Persons		
	Prosecuted.	Convicted or under trial.	Acquitted.
Bengal	247	154	93
North-Western Provinces and Oudh	890	777	113
Punjab	1,292	884	408
Central Provinces	626	528	98
British Burma	170	129	41*
Coorg	...	...	...
Ajmere	438	316	122
Assam	108	85	23
Total	3,771	2,873	898
Mysore	641	556	85
Berar	664	585	79
Grand Total	5,076	4,014	1,062

* The result of nineteen cases is not known.

The percentage of convictions to prosecutions was larger than in previous years, the average being 79 per cent. for the whole list; while in Bengal the percentage was 62, in the Punjab 68, and in Assam 78. This shows that, as a rule, the procedure taken was correct.

83. As regards the number of prosecutions in the reserved forests and outside them, the return of the Central Provinces shows that out of a total of 626 persons, 37 were prosecuted for offences committed in the first class reserves, while in the second class reserves the number was 589. From other provinces no data in this respect are available. Increase of forest offences.

The following figures give an abstract of the prosecutions, convictions, and acquittals in the provinces to which this review relates, during the five years since 1874-75. There has been a steady increase in this respect, but the increase is not considerable, and the number of prosecutions is still extremely small, considering the large area of the forests which are protected :—

Years.	Numbers of Persons			
	Prosecuted.	Convicted or under trial.	Acquitted.	Percentage of acquittals on prosecutions.
1874-75	3,066	2,688	378	12 per cent.
1875-76	4,833	4,310	523	11 „
1876-77	5,009	3,817	1,192	23 „
1877-78	5,419	3,906	1,513	28 „
1878-79	5,076	4,014	1,062	20 „

CHAPTER IV.

YIELD AND FINANCIAL RESULTS.

84. Statement I, appended to this Review, exhibits as usual the revenue and expenditure of the year in the provinces under the Government of India (not including the Presidencies of Madras and Bombay). General results.

In the following return an attempt has again been made to classify the outlay of the year under the three great heads—Outlay on (1) timber and other produce removed on Government account; (2) On timber and other produce removed by purchasers and other revenue; (3) On the formation, protection, and

improvement of the forests. In two provinces only (Bengal and Assam) has any attempt been made to prepare similar statements, based upon an intelligent analysis in detail of the items of expenditure. The present statement, therefore, could not, as it ought, be based upon the returns received from the several provinces; and the results can, therefore, only be regarded as a rough approximation.

Particulars.	Receipts.		Charges.	
	Amounts.	Budget heads.	Amounts.	Budget heads.
	Rs.		Rs.	
1. Timber and other produce removed on Government account	23,95,058	I.	15,13,256	I, ½ of VI, ¼ of B
2. Timber and other produce removed by purchasers, and other revenue . .	25,68,070	II, III, IV, V.	6,29,577	II, III, IV, IX, ½ of VI, ¼ of B.
3. Formation, protection, and improvement of the forests	...	.....	11,81,074	V, VII, VIII, ½ of B.
Total . .	49,63,128		33,23,907	

Receipts and charges on account of Government timber operations.

85. The average revenue realized, and the charges incurred on account of timber brought to depôt by Government agency, have been as follows during the last five years:—

Years.	Receipts.	Charges.
	Rs.	Rs.
1874-75	24,34,000	19,16,000
1875-76	35,00,000	16,43,000
1876-77	27,00,000	18,20,000
1877-78	29,61,000	15,58,000
1878-79	24,00,000	15,13,000
Average . . .	27,99,000	16,90,000

The charges include a due proportion of establishment and general charges.

Other forest revenue.

86. The remaining forest revenue consists of the following amounts:—

	Rs.
Timber removed by purchasers	21,46,681
Confiscated drift and waif wood	97,580
Revenue from forests not managed by Government . .	2,28,697
Other revenue	95,112
Total . .	25,68,070
And the charges debitable to this revenue amount to . .	6,29,577

During the last five years the receipts and charges on account of the other sources of revenue have been as follow:—

Years.	Receipts.	Charges.		
		A—Conservancy and Works.	B—Establishments.	Total.
	Rs.	Rs.	Rs.	Rs.
1874-75 . .	24,53,861	2,26,271	2,50,734	4,77,005
1875-76 . .	22,73,791	2,55,668	2,67,190	5,22,858
1876-77 . .	23,81,331	2,61,486	2,95,761	5,57,247
1877-78 . .	26,14,795	2,58,729	3,13,197	5,71,926
1878-79 . .	25,68,070	2,97,371	3,32,206	6,29,577

General Remarks.

87. Broadly speaking, it may be said that of the two great branches of forest revenue, the amount realized by the sale of timber exported of Government account averages 28 lakhs of rupees a year, against an outlay on 17 lakhs, and that other revenue produces between 23 and 26 lakhs by means of

an outlay of between 5 and 6¼ lakhs a year. The outlay on the formation, protection, and improvement of the forests, has, during the last five years, risen from Rs. 8,84,000 to Rs. 11,81,000, including the quota of establishment charges debitable to this head. These remarks, it will be understood, relate to the whole of the provinces under the Government of India, including the non-British provinces of Mysore and Berar; but they do not include the Presidencies of Madras and Bombay. In these provinces, it will be observed, there has not been any considerable increase of forest revenue during the last five years; and this is due chiefly to the following causes.

North-West Provinces an Oudh.

88. A diminished demand for timber, wood, bamboos, and other forest produce in the North-Western Provinces and Oudh, is attributed to the drought and scarcity which prevailed during part of this period.

The forest revenue from these provinces during the last five years has been as follows:—

	Government Timber.	Other Revenue.	Total.
1874-75	8,44,000	516,000	1,360,000
1875-76	6,87,000	5,73,000	12,60,000
1876-77	5,78,000	5,72,000	11,50,000
1877-78	7,27,500	4,72,500	12,00,000
1878-79	7,55,245	3,71,510	11,26,755

Burma.

89. In Burma there has been a considerable decrease of the forest revenue. It was Rs. 17,79,000 in 1875-76, Rs. 15,51,500 in 1876-77, and Rs. 16,03,000 in 1877-78, but fell to Rs. 11,37,500 in 1878-79. This is due chiefly to the necessity which was recognized in 1876 to suspend girdling operations in order to push on the demarcation of forests more rapidly. The necessary consequence of this measure was a diminished supply of timber, and consequently less revenue.

Punjab.

90. In the Punjab, also, there has been a great decrease of forest revenue, which is due to various causes, but chiefly to smaller quantities of timber felled.

The figures are as follows:—

	Government Timber.	Other Revenue.	Total.
1874-75	5,74,500	2,60,500	8,35,000
1875-76	6,65,000	2,41,000	9,06,000
1876-77	3,10,500	2,88,500	5,99,000
1877-78	3,92,500	2,91,500	6,84,000
1878-79	2,17,000	2,59,500	4,76,500

Bengal, Central Provinces and Assam.

91. On the other hand, in Bengal, the Central Provinces and Assam, the forest revenue has, subject to the usual fluctuation, increased steadily during this period, as will be seen from the following figures:—

	Bengal.	Central Provinces.	Assam.
1874-75	1,86,000	6,62,000	64,700
1875-76	1,98,000	7,25,000	1,07,000
1876-77	2,22,000	6,61,000	81,500
1877-78	4,26,000	6,84,000	1,34,000
1878-79	4,16,000	8,53,000	1,61,800

In these three provinces the chief forests which it is intended permanently to maintain have been selected, and their demarcation has been completed or is approaching completion; hence the time and attention of the establishments can now be chiefly devoted to the working of the forests, and a steady increase of the revenue is certain. How far the increased gross revenue in these three provinces will add to the surplus revenue must of course entirely depend upon the economical management of the forest business. In the Central Provinces efficient and economical management has now been firmly established; the rates paid for labour are moderate, and the continuance of strict economy may be said to be assured. In Bengal and Assam circumstances are difficult; labour is scarce and expensive, and there is perhaps room for greater economy. With rigid economy, however, the surplus forest revenue of these two provinces ought in a few years to be very considerable.

Punjab.

92. In the Punjab circumstances are singularly difficult. Demarcation has made very little progress, and consequently the only correct policy is to work the forests as sparingly as possible; and this has been the policy persistently and most properly followed by the Conservator. As an instance, it may

suffice to mention the number of trees cut in the forests leased from the Chamba State, in the Chenab and Ravi rivers, during the last ten years, of which the following is a summary:—

	Chenab.	Ravi.	Total.
Deodar green	1,773	1,155	2,928
Ditto, dead and windfall trees	4,862	389	5,251
Pinus excelsa	991	830	1,821
Total	7,626	2,374	10,000

Considering the area this is a very small quantity. These forests fortunately contained a large quantity of dry timber, which made it possible to maintain a considerable export, and thus their management has, during the ten years from 1869-70 to 1878-79, yielded a gross revenue of Rs. 21,64,284 against an outlay of Rs. 21,62,747, so that they at least have paid their expenses. But the stock of old timber is now exhausted, and accordingly during the last three years the revenue from this source has fallen considerably below the average. As soon as demarcation in these forests is completed, or nearly completed, fellings may be organized, and the revenue will thus increase. What has here been stated regarding the Ravi and Chenab forests, holds good with regard to other forest districts in the Punjab.

The plantations in the Punjab will also, within a few years, yield a large addition to the forest revenue. As already explained, the regular plantations now cover 17,000 acres; they have in 1878-79 yielded a revenue of Rs. 14,000, and the annual thinnings are considerable.

Burma.

93. Regarding the future forest revenue in Burma no apprehensions need be entertained. The strictly conservative management of the last 25 years has borne its fruit, and the forests now abound in young teak trees of all ages. In addition to natural reproduction there are regular plantations, measuring 3,339 acres; and toungya teak plantations, all well stocked and scattered in different reserves, measuring 2,193 acres; and the arrangements made admit of steady and considerable annual extensions, at a moderate cost, of these toungya teak plantations. There is, it is believed ample provision of young timber for the future, although toungya cultivation has done great injury to the teak forests in the hills. Nevertheless, the proper course would doubtless be, first to complete demarcation, and then to commence working the reserves in a systematic manner. But though demarcation has made great progress since it was earnestly taken in hand in 1875, it cannot by any means be regarded as certain that this satisfactory progress will continue, and that there will be no re-action. Indeed, it is not impossible that what remains to be done in this respect will meet with great difficulties, and will not be finished for many years to come; and under these circumstances it will be best to resume girdling operations, in order to guard against any continued decrease of the forest revenue.

Other provinces.

94. As regards the North-Western Provinces and Oudh the forest revenue may be expected to revive, but much will depend upon good management.

The forest revenue of Coorg is a small matter.

Forest administration in Ajmere, and the maintenance of the forest survey, must necessarily continue to be a source of expense; so that the prospect of a considerable surplus revenue must chiefly be based upon the progress of forest administration in Bengal, the North-Western Provinces and Oudh, the Central Provinces, British Burma and Assam.

Increase of gross forest revenue.

95. Although, however, the forest revenue during the last five years has been stationary, its growth during a longer period has been very marked. The following are the quinquennial averages, during the last fifeen years, of the forest revenue realized in the provinces to which the present review relates:—

	Rs.
1864-65 to 1868-69 (five years)	25,43,470
1869-70 to 1873-74 „	41,95,588
1874-75 to 1878-79 „	52,53,375

96. The exports of forest produce from India during the year under review have been as follows:— Export of forest produce beyond India.

Articles.	Quantity in tons of 20 cwt. In the case of teak 50 cubic feet.		Valuation at port of shipment in 1878-79.	
	Average of 8 years, 1870-71—1877-78.	In 1878-79.	Total.	Per ton.
			Rs.	Rs.
1. Caoutchouc	741	502	6,16,848	1,229
2. Shell-lac	3,851	3,225	22,24,843	690
3. Lac-dye	622	413	1,95,285	473
4. Sandal-wood, ebony, and other ornamental woods.	(Not known).	(Not known).	3,31,741	(Not known).
5. Cutch and gambier	10,566	10,866	18,79,265	173
6. Myrobalans	*19,743	27,067	23,45,740	87
7. Teak	51,728	37,413	26,89,586	72

* Average of 3 years only.

97. The demand for myrobalans (the fruit of *Terminalia Chebula*) is still on the increase. The quantities exported, and their estimated value during the last three years, have been— Myrobalans.

	Tons.	Rs.
1876-77	17,925	13,50,254
1877-78	26,852	23,05,268
1878-79	27,067	23,45,740

Besides in the Bombay Presidency, attention has been paid to the collection of myrobalans, and to the cultivation of the tree in the highlands of the Central Provinces, and the fruit of the Pangahben, *Terminalia tomentella*, (Kz.:), an allied species in Burma which has the same properties as the fruit of *Terminalia Chebula*, will probably become an important article of export from Rangoon. The demand in Europe and America for good tanning materials, such as cutch and myrobalans, is likely to increase. Forest officers in India should bear in mind that the increased production of wood and timber is not their only duty, but hat the increased production of other valuable forest produce may, in some cases, be of much greater importance than the production of timber.

98. The quantity and value of the sandal-wood sold on account of Government in Mysore and Coorg during the year were as follows:— Sandal-wood.

		Tons.	Amount realized.	
			Per ton.	Total.
			Rs.	Rs.
Mysore	Good wood	968	338	3,65,188
	Inferior wood	112		
Coorg	Good wood	191¼	550	10,732
	Inferior wood	14½	249	3,614
	Total	1,113¾	340	3,79,534

99. The trade in teak timber in British Burma has been as follows:— Trade in teak timber.

Period.	Yield of Government forests in British Burma.	Imports from Foreign territory	Exports from Rangoon and Moulmein.
	(In tons of 50 cubic feet)		
Average of 8 years, from 1870-71 to 1877-78	48,300	1,88,852	1,43,234
Ditto ditto 1878-79	33,397	1,70,610	1,33,820

The yield of the British forests shows a considerable diminution which is due to the suspension of girdling operations as previously explained. There has also been a decrease in the timber imported from beyond the frontier, which however is only temporary, and may be ascribed to low prices of timber.

Of the teak timber exported by sea 37,413 tons were shipped to non-Indian ports, against 56,939 in 1877-78,* 45,108 in 1876-77, and 60,612* in 1875-76. The decrease in these exports is chiefly due to the less demand for teak timber in Europe, which, however, is believed to have been of a temporary nature only.

Financial results compared with those of previous years.

100. Excluding Mysore and Berar, the surplus forest revenue from the British Provinces during the last three years has been as follows :—

Presidency.	Years.		
	1876-77.	1877-78.	1878-79.
Bengal	12,51,706	19,47,038	12,05,936
Madras	1,342	21,671	40,089
Bombay	3,94,716	4,04,585	1,82,732
Total . .	16,47,764	23,73,294	14,28,757

The year has been most unfavourable financially, the surplus having been less than any obtained since 1870-71. This is due partly to the small revenue realized in the North-Western Provinces and Oudh, the Punjab and Burma as already explained, partly to the exceptionally small surplus obtained in the Bombay Presidency, which is less than any realized since 1866-67.

Area of reserved forests in the Bombay Presidency.

101. Excellent progress has been made in the demarcation of reserved forests in the Bombay Presidency, and the areas of reserved forests on the 31st March 1879 were as follows :—

	Square miles.	Acres.
Sind	536	343,326
Northern Division	7,166	4,586,059
Southern Division	955	611,565
Total	8,657	5,541,131

These are the areas gazetted under the Indian Forest Act.

Sind: changes of area.

102. In Sind the forest area is subject to annual losses by the action of the river. In 1878-79, 7,600 acres were lost, of which more than one-half was covered with valuable forest. On the other hand, 15,345 acres were gained by accretion.

Reproduction.

103. The necessity of special protection of blocks in which cuttings had been made in order to ensure reproduction appears now to be fully recognized in Sind. The Report states, that 64,648 acres were fenced in for natural reproduction, and that the young growth, partly coppice, partly self-sown seedlings, was very good. This area includes 31,461 acres, regarding which it is stated that the plants are now so high that the area has been opened to grazing except for camels and goats.

Demand for fuel.

104. The chief demand upon the Sind forests is for fuel. This demand had increased in ten years from 854,206 maunds to 14,03,413 maunds, which was the yield of 1876-77 and 1877-78 In 1878-79 it fell to 1,242,710 maunds, and this demand is not likely to be reached again for many years to come, as it has been decided to burn coal on the Indus Valley Railway in Sind, and as the steamer traffic has fallen off to about one-half of what it was before the opening of the railway. There was some increase in the demand for timber, but not sufficient to compensate for the less consumption of fuel. Expressing the fuel in cubic feet of solid wood, the total yield was 2,283,285 cubic feet in 1878-79 against 2,532,795 cubic feet in 1877-78, corresponding to 6·6 cubic feet per acre, against 7·5 in the previous year. In the same way the money yield per acre has fallen from Re. 1-1-1 to Re. 1-0-5 per acre.

Northern Division.

105. In the Northern Division the reserved forests at the commencement of the year measured 4,407 square miles, which were increased by additions made during the year to 7,166 square miles. Of this area 1,612 square miles are in Khandesh and 1,281 square miles in Nasik. Great attention has been paid

* These are the correct figures for 1875-76 and 1877-78. The figures entered in previous Reviews for these years have been altered in subsequent Trade and Navigation Accounts.

to the inclusion of as large areas of the dry denuded hill ranges in the most northern districts of the Deccan, and accordingly there were at the close of the year :—

In Ahmednagar	778 square miles.
Poona	667 „
Sholapur	50 „
Satara	685 „

In addition to the reserved forests 1,834 square miles were declared as protected forest, of which 1,041 square miles are in Thana and 713 square miles in Khandesh.

Endeavours were made to place a larger area of forest under protection in the Ratnagiri district which had become almost completely denuded, because the right of Government on the timber standing on the lands held under the Khote tenure had for a long time been under dispute. The area of the reserves was increased from 14 to 20 square miles, and the Revenue Commissioner, Southern Division, reports that a large area will, in the course of next year, be added to the forest area in this district, and that the Khotes generally will have a strong interest in extending it and in protecting forests in the produce of which they will share.

Training school at Poona.

106. A training school for native foresters and Forest rangers was established in connection with the Civil Engineering College, Poona. Students are selected by public competition, and the course of instruction, which will extend over two years, comprises mathematics and surveying, the elements of natural sciences, forestry and forest laws. Appointments of Forest Rangers and foresters on rates of pay between Rs. 20 and Rs. 50 per mensem are to be given to students who have successfully completed their course of instruction in their order of merit, which will be determined by the results of the examinations passed by them.

Southern Division.

107. In the Southern Division the area of reserved forests at the close of 1877-78 was reported to be 1,695 square miles, but of this area only 955 square miles have been so declared under the Indian Forest Act. In addition to these, 3,662 square miles have been declared protected forests. Of the four districts which comprise the Southern Division, Kanara has the largest forest area, *viz.*, 3,514 square miles out of a total area of the district of 4,235 square miles. Successful efforts have also been made to place under protection a portion of the dry and denuded hills of the three inland collectorates of Belgaum, Dharwar, and Kaladgi.

Collection of myrobalans and soap-berries.

108. The system of departmental collection which has proved so successful in the case of myrobalans has now been extended to soap-berries, the fruit of *Sapindus emarginatus*. The amount realized on account of this minor produce, including the value of stock in hand at current rates, was Rs. 82,217, against an expenditure of Rs. 48,230. The saw mill in Kanara worked satisfactorily, but the demand for timber was slack, and the mill had to be worked at half-power.

Financial results.

109. The financial results of forest administration in the Bombay Presidency during the year under review have been unfavourable, owing to the short demand for timber and other forest produce, which was the result of several years of drought and famine in the inland districts and the stagnation of trade at the sea ports. During the last fourteen years the periodical averages of receipts and charges in the Bombay Presidency have been as follows :—

	Receipts. Rs.	Charges. Rs.	Surplus. Rs.
1864-65 to 1868-69, (5 years) . . .	9,99,363	6,24,962	3,74,401
1869-70 to 1873-74, (5 years) . . .	11,79,477	6,34,180	5,45,297
1874-75 to 1877-78, (4 years) . . .	12,40,213	8,20,870	4,19,343

and the figures for the year under review have been—

1878-79	11,81,893	9,98,161	1,83,732

Thus, while the receipts have diminished, the charges have increased, and hence the surplus has fallen to a very low figure.

Conclusion.

110. Thus; all over India the financial results of forest administration have been most unfavourable in the year under review. The set-off against this

unfavourable result is, that the principal forest domains of Government have now been demarcated in all provinces, except the Punjab, Burma, and the Madras Presidency, and are safe against encroachment and deterioration, and that their condition has been greatly improved by protection, planting, and other works of improvement. These domains now constitute a large and unfailing source of timber, wood, grass, and other forest produce for the population in their vicinity, as well as for the requirements of trade, and they will exercise a most beneficial influence in other respects upon the well-being of the country. It may be confidently affirmed that the small area of reserved forests (64,000 acres) demarcated and protected in Ajmir and Merwara will not only increase the supply of water, wood, and cattle fodder in the adjacent villages in ordinary years, but will in a year of drought tend greatly to mitigate the effects of such drought, and, in the same manner, it may be expected that the demarcation and protection of forest reserves in the Deccan will directly benefit the agriculture of those districts, and that in other provinces also the preservation of the forests will be directly beneficial to agricultural interests.

But the fact remains that the advantages expected to be derived from the forests are mostly prospective, and that the necessity for producing a large surplus revenue is a present necessity which is most pressing. During the last five years the attention of Forest officers has been, and very properly so, chiefly devoted to the demarcation, protection, and improvement of the forests; and this, together with the stagnation of trade and the effects of the drought and scarcity which have lately prevailed in many provinces and districts of India has caused the surplus revenue to fall. It is now the chief duty of those who are responsible for forest administration in the several provinces during, say, the next five years, to devote attention chiefly to the production of revenue and to the rational working of the forests.

STATEMENT I.

Summary of Revenue and Expenditure during the year 1878-79.

Budget Headings.	Bengal.	North-Western Provinces and Oudh.	Punjab.	Central Provinces.	British Burmah.	Coorg.	Assam.	Ajmere.	Surveys.	Total of the British Provinces under the Government of India.	Mysore.	Berar.	Total of Mysore and Berar.	Grand Total of all Provinces.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Receipts—														
I. Timber and other produce removed from the forests by Government agency.	1,65,442	7,55,245	2,16,924	1,28,956	6,98,529	20,869	11,838	241	...	19,98,044	3,96,372	641	3,97,013	23,95,057
II. Timber and other produce removed from the forests by consumers or purchasers.	2,44,556	3,62,722	2,34,112	6,99,793	99,966	22,309	1,47,424	377	...	18,11,259	53,596	2,81,825	3,35,421	21,46,680
III. Confiscated drift and waif wood	1,691	3,703	14,374	4,676	68,699	802	782	1	..	94,728	1,179	1,673	2,852	97,580
IV. Revenue from forests not managed by Government.	...	..	1,022	60	2,26,269	...	1,346	...	...	2,28,697	...	..	...	2,28,697
V. Miscellaneous	4,335	5,085	10,143	19,377	44,099	8,040	389	622	63	92,153	1,428	1,531	2,959	95,112
Total Receipts	4,16,024	11,26,755	4,76,575	8,52,862	11,37,562	52,020	1,61,779	1,241	63	42,24,881	4,52,575	2,85,670	7,38,245	49,63,126
Expenditure—														
A. Conservancy and Works—														
I. Timber and other produce removed from the forests by Government agency.	83,579	4,08,859	1,25,278	74,520	3,59,302	6,810	12,981	5	...	10,71,334	47,664	159	47,823	11,19,157
II. Timber and other produce removed from the forests by consumers or purchasers.	12,725	24,007	1,430	1,12,277	6,195	...	610	13	...	1,57,257	...	5,829	5,829	1,63,086
III. Confiscated drift and waif wood	474	414	145	...	41,423	...	16	...	...	42,472	2	...	2	42,474
IV. Revenue from forests not managed by Government	...	...	...	...	...	...	...	...	...	...	...	...	...	...
V. Rent of leased forests and payments to shareholders in forests managed by Government.	...	10,351	34,653	1,209	...	...	50	...	...	46,263	...	17,120	17,120	63,383
VI. Live and dead stock	11,636	21,301	5,541	19,734	40,686	405	16,612	127	3,967	1,20,009	757	3,022	3,779	1,23,788
VII. Communications and buildings	8,363	63,639	20,128	5,434	13,631	864	6,943	867	...	1,19,869	990	1,955	2,945	1,22,814
VIII. Demarcation, improvement and extension of forests.	86,877	37,979	66,018	19,059	36,640	6,489	25,980	4,170	6,696	2,89,908	31,505	9,054	40,559	3,30,467
IX. Miscellaneous	7,260	5,535	5,759	3,796	2,906	103	1,327	...	...	26,686	824	2,405	3,229	29,915
Total Conservancy and Works	2,10,914	5,72,086	2,58,952	2,36,029	5,00.783	14,671	64,519	5,182	10,663	18,73,798	81,742	89,544	1,21,286	19,95,084
B.—Establishments.—														
I. Salaries	1,11,704	1,96,940	2,13,562	1,32,836	1,78.534	15,690	51,448	6,992	38,879	9,46,585	98,759	56,664	1,55,423	11,02,008
II. Travelling allowances	10,434	29,259	36,656	14,304	29,099	3,278	6,988	769	7,659	1,38,446	13,136	5,998	19,134	1,57,580
III. Contingencies	5,619	11,693	14,384	10,546	9,985	1,190	3,072	502	3,124	60,115	4,383	5,143	9,526	69,641
Total Establishment	1,27,757	2,37,892	2,64,602	1,57,686	2,17,618	20,158	61,508	8,263	49,662	11,45,146	1,16,278	67,805	1,84,083	13,29,229
Grand Total of Expenditure	3,38,671	8,09,977	5,23,554	3,93,715	7,18,401	34,829	1,26,027	13,445	60,325	30,18,044	1,98,020	1,07,350	3,05,369	33,24,313
Surplus	77,353	3,16,778	...	4,59,147	4,19,161	17,191	35,752	...	...	12,05,937	2,54,555	1,78,320	4,32,876	16,38,813
Deficit	...	...	46,979	...	...	...	...	12,204	60,262	..	...	..	..	..

STATEMENT II.

Receipts and Charges of the Forest Department throughout India during the fifteen years from 1864-65 to 1878-79.

RECEIPTS.

Provinces.	1864-65.	1865-66.	1866-67. (11 months.)	1867-68.	1868-69.	1869-70.	1870-71.	1871-72.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Bengal	...	38,584	50,555	75,687	2,24,546	1,13,753	1,19,678	1,39,088	1,49,851	1,16,633	1,85,933	1,98,274	2,22,401	4,26,228	4,16,024
North-Western Provinces and Oudh	6,93,644	7,70,370	7,79,200	5,77,644	7,85,211	8,33,077	4,25,257	11,70,901	19,39,114	19,32,677	13,63,358	12,64,356	11,50,671	12,03,108	11,26,755
Punjab	2,95,730	2,08,050	2,31,470	2,79,297	3,45,164	3,94,132	10,40,368	7,35,002	6,52,994	7,32,540	8,34,874	9,05,742	5,98,754	6,83,710	4,76,575
Central Provinces	89,307	2,02,644	3,67,095	3,49,491	3,50,536	4,16,020	6,58,120	4,47,764	4,81,673	5,68,367	6,61,779	7,25,335	6,61,326	6,83,910	8,52,862
British Burma	9,36,233	8,98,629	4,24,053	6,47,590	8,16,171	9,84,773	8,18,124	7,72,399	8,27,469	10,68,621	10,74,802	17,79,020	15,51,468	16,03,023	11,37,562
Coorg	1,02,218	1,08,257	31,934	77,746	74,448	1,08,152	74,067	92,453	84,424	1,10,079	58,012	1,07,457	75,929	1,01,015	52,020
Ajmere	...	...	...	...	...	...	...	...	24	508	203	410	905	3,002	1,241
Assam	...	...	...	...	...	...	...	...	...	62,736	64,749	1,07,302	81,568	1,34,326	1,61,779
Surveys	...	...	...	...	...	...	...	...	...	...	...	...	...	...	63
Total	21,17,132	22,26,534	18,84,307	20,07,455	25,96,078	28,49,907	31,35,614	33,57,607	41,35,549	45,92,151	42,43,710	50,87,896	43,43,022	48,38,322	42,24,881
Madras	3,11,778	3,26,204	3,38,608	4,24,184	3,91,179	4,95,789	3,39,762	4,18,882	4,18,767	4,64,194	3,64,326	4,26,359	4,15,312	4,04,164	3,83,878
Bombay and Sind	10,70,210	10,07,610	8,21,268	8,84,245	12,13,482	12,35,257	11,77,425	11,50,210	11,46,404	11,88,090	12,23,995	12,48,672	12,26,658	12,61,529	11,81,893
Total Revenue (British India)	34,99,120	35,60,348	30,44,183	33,15,884	42,00,737	45,80,953	46,52,801	49,26,699	57,00,720	62,44,435	58,32,031	67,62,927	59,84,992	65,04,015	57,90,652
Mysore	3,16,331	3,42,959	2,66,020	4,10,012	3,51,476	2,95,218	3,37,669	3,99,511	3,76,185	4,97,060	3,83,124	4,56,271	4,66,956	4,58,588	4,52,575
Hyderabad	2,368	15,106	43,574	53,446	84,556	1,45,481	1,77,329	1,55,544	2,59,861	2,63,256	2,60,674	2,32,817	2,53,136	2,79,231	2,85,670
Total Revenue (Mysore and Hyderabad)	3,18,699	3,58,065	3,09,594	4,63,458	4,36,032	4,40,699	5,14,998	5,55,055	6,36,046	7,60,316	6,43,798	6,89,088	7,20,092	7,37,819	7,38,245
GRAND TOTAL OF REVENUE	38,17,819	39,18,413	33,53,777	37,79,342	46,36,769	50,21,652	51,67,799	54,81,754	63,36,766	70,04,751	64,75,829	74,52,015	67,05,084	72,41,834	65,28,897

STATEMENT II—*continued.*

EXPENDITURE.

A.—On Conservancy and Works.

Provinces.	1864-65.	1865-66.	1866-67 (11 months.)	1867-68.	1868-69.	1869-70.	1870-71.	1871-72.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Bengal	2,092	19,480	89,326	1,41,382	95,581	61,004	26,272	43,907	28,526	28,552	39,062	68,255	90,172	1,46,857	2,10,914
North-Western Provinces and Oudh	3,82,780	2,45,158	2,66,187	2,74,818	3,69,869	3,59,149	5,94,829	8,95,931	9,54,515	9,72,991	8,75,039	5,40,335	6,50,002	5,09,796	5,72,085
Punjab	1,62,120	1,94,110	1,76,950	1,75,920	1,93,516	5,55,375	10,30,005	4,78,003	5,45,068	3,54,457	4,19,305	3,18,498	2,70,330	2,58,949	2,58,952
Central Provinces	35,610	38,504	46,817	1,13,068	1,86,925	3,65,801	1,95,251	1,24,621	1,33,666	1,67,010	1,78,513	2,40,523	1,67,334	1,78,401	2,36,029
British Burma	1,77,158	2,21,739	2,04,591	2,25,049	3,22,981	3,11,404	2,89,445	2,45,514	2,03,929	3,32,391	5,31,841	6,60,515	8,22,064	6,40,062	5,00,783
Coorg	4,688	3,395	4,425	5,354	7,175	22,851	14,822	20,714	18,324	23,001	23,773	25,991	18,493	16,453	14,671
Ajmere	...	...	..	.	...	...	...	...	4,878	15,777	17,753	12,963	11,433	6,961	5,182
Assam	...	...	..	...	...	...	...	...	..	18,901	31,138	33,187	42,005	48,954	64,519
Surveys	...	...	...	...	...	...	...	...	8,303	7,420	3,906	5,134	7,684	10,024	10,663
Total	7,64,448	7,22,986	7,88,296	9,35,591	11,76,047	16,75,584	21,50,624	18,08,690	18,97,209	19,20,500	21,20,330	19,05,401	20,79,517	18,16,459	18,73,798
Madras	94,657	1,36,528	1,14,251	1,62,037	1,32,693	1,46,821	1,56,779	1,94,814	3,03,735	1,75,370	2,21,384	2,39,945	1,94,943	1,59,867	1,24,337
Bombay and Sind	3,17,699	5,63,067	4,36,470	3,32,175	3,87,412	3,28,985	3,84,638	3,27,729	4,34,612	4,11,547	5,20,049	4,80,801	5,30,394	5,36,477	6,37,117
Total (British India)	11,76,804	14,22,581	13,39,017	14,29,803	16,96,152	21,51,390	26,92,041	23,31,233	26,35,556	25,07,417	28,62,243	26,26,147	28,04,854	25,12,803	26,35,252
Mysore	14,022	42,979	32,165	52,317	59,274	44,252	81,061	87,326	95,950	1,12,460	1,08,401	1,10,772	1,09,761	81,213	81,742
Hyderabad	...	...	...	2,184	6,552	22,018	43,034	62,759	45,062	44,117	45,514	42,287	40,506	49,715	39,544
Total (Mysore and Hyderabad)	14,022	42,979	32,165	54,501	65,826	66,270	1,24,095	1,50,085	1,41,021	1,56,577	1,53,915	1,53,059	1,50,267	1,30,928	1,21,286
GRAND TOTAL	11,90,826	14,65,560	13,71,182	14,84,304	17,61,978	22,17,660	28,16,136	24,81,318	27,76,577	26,63,994	30,16,158	27,79,206	29,55,121	26,43,731	27,56,538

STATEMENT II—*continued.*

EXPENDITURE.

B.—On Establishments.

PROVINCES.	1864-65.	1865-66.	1866-67 (11 months.)	1867-68.	1868-69.	1869-70.	1870-71.	1871-72.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Bengal	6,604	16,292	14,881	24,223	30,676	34,870	60,186	64,429	71,090	56,936	60,341	70,831	1,21,517	1,14,354	1,27,757
North-Western Provinces and Oudh	92,893	1,06,125	1,05,282	1,08,204	1,31,090	1,69,531	1,81,047	2,01,020	2,07,917	1,92,949	1,85,663	1,95,994	2,10,247	2,18,427	2,37,892
Punjab	84,665	77,968	78,680	97,955	1,15,828	1,58,279	2,03,951	2,27,321	2,50,874	2,42,705	2,27,175	2,35,728	2,52,153	2,58,217	2,64,602
Central Provinces	61,946	74,994	81,041	99,031	1,07,730	1,08,445	1,12,182	1,07,059	1,11,171	1,16,546	1,15,726	1,30,240	1,21,306	1,39,277	1,57,686
British Burma	86,081	90,327	80,544	1,03,339	99,191	1,10,058	1,11,293	1,32,935	1,32,095	1,42,140	1,30,797	1,54,235	1,82,980	2,15,754	2,17,618
Coorg	4,201	8,654	7,127	8,610	9,301	10,231	9,777	10,267	11,340	11,708	14,226	11,688	14,836	19,814	20,158
Ajmere	...	...	...				...	...	8,177	8,563	8,813	14,383	11,025	7,965	8,263
Assam	..	...	...	..	...	...	...	...	..	31,721	28,385	28,697	47,915	51,333	61,508
Surveys	...	...	..	..	...	...	...	...	12,875	42,852	57,614	53,859	49,820	49,684	49,662
Total of Establishment Charges	3,36,390	3,74,360	3,67,555	4,41,362	4,93,816	5,91,414	6,78,436	7,43,031	8,08,539	8,46,120	8,28,740	8,95,655	10,11,799	10,74,825	11,35,146
TOTAL OF ALL CHARGES	11,00,838	10,97,346	11,55,851	13,76,953	16,69,863	22,66,998	28,29,060	25,51,721	27,05,748	27,66,620	29,49,070	28,01,056	30,91,316	28,91,284	30,18,944
Madras	95,300	1,17,054	1,02,920	1,26,223	1,37,779	1,39,870	1,38,081	1,50,902	1,74,412	1,77,814	1,76,008	1,90,138	2,19,027	2,22,626	2,19,452
Bombay	2,10,352	2,11,987	2,10,973	2,14,962	2,39,711	2,15,811	2,38 125	2,57,035	2,78,430	2,93,990	2,96,071	2,97,476	3,01,548	3,20,466	3,62,044
Total of Establishment Charges (British India)	6,42,042	7,03,401	6,81,448	7,82,547	8,71,306	9,47,095	10,54,642	11,50,968	12,61.381	13,17,924	13,00,819	13,83,469	15,32,374	16,17,918	17,26,642
TOTAL OF ALL CHARGES (BRITISH INDIA)	18,18,846	21,25,982	20,20,465	22,12,350	25,67,458	30,98,485	37,46,683	34,82,201	38,96,937	38.25,341	41,63,062	40,09,616	43,37,228	41,30,721	43,61,894
Mysore	53,018	54,768	53 823	57,725	60,677	59,998	64,381	71,776	96,159	1,23,773	1,28,321	1,24,520	1,17,101	1,17,710	1,16,278
Hyderabad	478	8,991	13,718	16,157	27,553	58,692	38,938	38,061	37,994	41,523	45,875	48,586	54,146	60,253	67,805
Total of Establishment Charges (Mysore and Hyderabad)	53,496	63,759	67,541	73,882	88,230	1,18,690	1,03,319	1,09,847	1,34,153	1,65,296	1,74,196	1,73,106	1,71,247	1,77,963	1,84,083
GRAND TOTAL OF ESTABLISHMENT CHARGES	6,95,538	7,67,160	7,48.989	8,56,429	9,59,536	10,65,785	11,57,961	12,60,815	13,95,534	14,83,220	14,75,015	15,56,575	17,03,621	17,95,881	19,10,725
GRAND TOTAL OF ALL CHARGES	18,86,364	22,32,720	21,20,171	23,40,733	27,21,514	32,83,445	39,74,097	37,42,133	41,72,111	41,47,214	44,91,173	43,35,781	46.58,742	44,39.612	46,67,263

STATEMENT II—*concluded.*

C.—SURPLUS REVENUE.

PROVINCES.	1864-65.	1865-66.	1866-67 (11 months.)	1867-68.	1868-69.	1869-70.	1870-71.	1871-72.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
British India, excluding Madras and Bombay	10,16,294	11,29,188	7,28,456	6,30,502	9,26,213	5,82,909	3,06,554	8,05,886	14,29,801	18,25,531	12,94,640	22,86,840	12,51,706	19,47,038	12,05,937
The Presidency of Madras	1,21,821	72,622	1,21,437	1,35,924	1,20,707	2,09,098	44,902	73,166	(Deficit 59,380)	1,11,010	(Deficit 33,546)	(Deficit 3,724)	1,342	21,671	40,089
„ of Bombay	5,42,159	2,32,556	1,73,825	3,37,108	5,86,359	6,90,461	5,54,662	5,65,446	4,33,362	4,82,553	4,07,875	4,70,195	3,94,716	4,04,585	1,82,732
TOTAL NET REVENUE (BRITISH INDIA)	16,80,274	14,34,366	10,23,718	11,03,534	16,33,279	14,82,468	9,06,118	14,44,498	18,03,783	24,19,094	16,68,969	27,53,311	16,47,764	23,73,294	14,28,758
Mysore	2,49,291	2,45,212	1,80,092	2,99,970	2,31,525	1,90,968	1,92,223	2,40,409	1,84,067	2,60,827	1,46,402	2,20,979	2,40,094	2,59,665	2,54,555
Hyderabad	1,890	6,115	29,856	35,105	50,451	64,771	95,357	54,714	1,76,805	1,77,616	1,69,285	1,41,944	1,58,484	1,69,263	1,78,321
TOTAL NET REVENUE (MYSORE AND HYDERABAD)	2,51,181	2,51,327	2,09,888	3,35,075	2,81,976	2,55,739	2,87,584	2,95,123	3,60,872	4,38,443	3,15,687	3,62,923	3,98,578	4,28,928	4,32,876
GRAND TOTAL OF NET REVENUE	19,31,455	16,85,693	12,33,606	14,38,609	19,15,255	17,38,207	11,93,702	17,39,621	21,64,655	28,57,537	19,84,656	31,16,234	20,46,342	28,02,222	18,61,634

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